

THE HOPE REPORTS

VOL. XV

1915—1929

INSECTS OF THE OXFORD DISTRICT;
HOPE DEPT. REPORTS,
1915—1928.

EDITED BY

EDWARD B. POULTON, M.A., D.Sc., Oxon,
Sydney,

HON. LL.D. PRINCETON, HON. D.Sc. DURH., DUBL., F.R.S., ETC.
HOPE PROFESSOR OF ZOOLOGY IN THE UNIVERSITY OF OXFORD
FELLOW OF JESUS COLLEGE, OXFORD
FOREIGN MEMBER K. SVENSKA VETENSK. AKAD., STOCKHOLM
MEMBRE HONORAIRE DE LA SOCIÉTÉ ENTOMOLOGIQUE DE BELGIQUE
SOCIO HONORARIO DE LA REAL SOCIEDAD ESPAÑOLA DE HISTORIA NATURAL
CORRESPONDENT OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA
HONORARY MEMBER OF THE ACADEMY OF SCIENCE, NEW YORK
CORRESPONDING MEMBER OF THE SOCIETY OF NATURAL HISTORY, BOSTON, AND
THE AMERICAN ENTOMOLOGICAL SOCIETY

OXFORD

PRINTED FOR PRIVATE CIRCULATION

1929



ALFRED ROBINSON, DEL.

THE MAKERS OF THE HOPE DEPARTMENT
OXFORD UNIVERSITY MUSEUM

THE HOPE REPORTS

VOL. XV

1915—1929

INSECTS OF THE OXFORD DISTRICT;
HOPE DEPT. REPORTS,
1915—1928.

EDITED BY

EDWARD B. POULTON, M.A., D.Sc., Oxon,
Sydney,

HON. LL.D. PRINCETON, HON. D.Sc. DURH., DUBL., F.R.S., ETC.

HOPE PROFESSOR OF ZOOLOGY IN THE UNIVERSITY OF OXFORD

FELLOW OF JESUS COLLEGE, OXFORD

FOREIGN MEMBER K. SVENSKA VETENSK. AKAD., STOCKHOLM

MEMBRE HONORAIRE DE LA SOCIÉTÉ ENTOMOLOGIQUE DE BELGIQUE

SOCIO HONORARIO DE LA REAL SOCIEDAD ESPANOLA DE HISTORIA NATURAL

CORRESPONDENT OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

HONORARY MEMBER OF THE ACADEMY OF SCIENCE, NEW YORK

CORRESPONDING MEMBER OF THE SOCIETY OF NATURAL HISTORY, BOSTON, AND

THE AMERICAN ENTOMOLOGICAL SOCIETY

OXFORD

PRINTED FOR PRIVATE CIRCULATION

1929

PREFACE

The first section of Volume XV is devoted to British Entomology, chiefly that of the Oxford District; the second to the Reports of the Professor from 1915 to 1929.

No. 2, the Entomology of the Oxford District, under the editorship of Commander Walker, forms an appropriate beginning to the volume. The Introduction, Beetles, Butterflies and large Moths, are written by the Editor; the Orthoptera and five of the groups formerly massed together in the Neuroptera, by Mr. W. J. Lucas; the Hymenoptera and Diptera, by Mr. A. H. Hamm; the Micro-Lepidoptera, by Prof. E. G. R. Waters; the Hemiptera, by Mr. Joseph Collins; the Arachnida, by Prof. A. W. Pickard-Cambridge; and a brief history of the Hope Department, by the Professor.

Nos. 3 to 10 by Prof. Waters are devoted to the Micro-Lepidoptera, the first paper being a valuable list of these insects so far as they are known from the Oxford District. It was written for the 1928 Report of the Ashmolean Natural History Society of Oxfordshire, and published in the present year. The remaining papers by Prof. Waters appeared in the Entomologist's Monthly Magazine:—Nos. 4A—4C, the continuation of a series on the Tineina in the Oxford District; No. 5, on *Glyphipteryx*; No. 6, on a new *Coleophora*, followed by 6A, where Mr. O. W. Richards, in collaboration with Prof. Waters, describes and figures the genitalia of certain species in the same genus; No. 7, on *Lithocolletis*; Nos. 8—10, on the Nepticulidae.

This interesting contribution to the study of minute British Moths is followed by Commander Walker's three papers:—No. 11, on the occurrence of a Noctuid Moth new to the British list, as proved by the notes recorded by the late Mr. Arthur Sidgwick, who bred the insect at Oxford, and by the specimen in his collection; No. 12, on the occurrence of the N. American 'Monarch' Butterfly (*D. plexippus*) in recent years at Oxford; No. 13, on the capture of a very rare beetle on Shotover Hill by

Dr. J. W. Munro. These three and all the succeeding papers up to No. 21, were, with the exception of Nos. 15, 19 and 20, published in the Entomologist's Monthly Magazine.

Nos. 14 to 17, by different authors, also deal with Oxford insects: 14, by Mr. A. H. Hamm, on a beetle bred from the cells of the bee, *Osmia rufa*; 15, by Mr. K. G. Blair, on the beetle-remains found in the Pleistocene peat-bed at Wolvercote; 16, by Mr. J. Collins, on Tachinid flies captured in the Oxford district in 1925; 17, by Mr. O. W. Richards, on new species of flies of the genus *Limosina*, from the same district.

No. 18, by Commander Walker, an obituary notice of Francis Cardew Woodforde, is succeeded by a paper written by this warm friend of the Department and describing some of the treasures among the British Butterflies and Moths to which he added so greatly. Another paper, which appeared after the author's death, is included as No. 9 in Volume XVIII of these Reports. The deep debt of gratitude which we owe to his memory is acknowledged in the brief Introduction.

The two papers preceding the series of Reports from the University Gazette which conclude this volume, describe portions of the historic Dale Collection—No. 20, by Mr. W. G. Sheldon, on the series of the variable Moth *Peronea cristana* and the type-specimen of its aberration *gumpinana*; No. 21, by Mr. W. J. Lucas, on the Grasshoppers, thus concluding his account of the Dale Orthoptera.

Nos. 22 to 28—seven Reports of the Hope Professor, from the University Gazette, conclude the volume. Of these the first is a condensed summary of the years 1915 to 1922, during which no other Reports appeared. The remaining six deal respectively with the six years 1923 to 1928.

EDWARD B. POULTON.

Hope Department of Zoology,
University Museum, Oxford.
14 October, 1929.

CONTENTS

References to the original channels of publication, omitted from some of the separata, are given in the following list.

1. Preface.
2. The Entomology of the Oxford District (from the Handbook of the British Association, 1926).
Introduction, by James J. Walker, R.N., Hon. M.A., F.L.S., F.E.S. (pp. 161, 162).
Orthoptera, Psocoptera, Ephemeroptera, Paraneuroptera, Neuroptera and Trichoptera, by W. J. Lucas, B.A., F.E.S. (pp. 163—173).
Hymenoptera, by A. H. Hamm, A.L.S., F.E.S. (pp. 174—186).
Coleoptera, Rhopalocera and Macro-Lepidoptera, by J. J. Walker (pp. 187—229).
Micro-Lepidoptera, by Prof. E. G. R. Waters, M.A., F.E.S. (pp. 230—247).
Diptera, by A. H. Hamm (pp. 248—279).
Hemiptera, by Joseph Collins (pp. 280—298).
Arachnida, by Prof. A. W. Pickard-Cambridge, M.A., F.E.S. (pp. 299—303).
The Hope Department, Oxford University Museum, by the Professor (pp. 313—318).
3. A List of the Micro-Lepidoptera of the Oxford District, by Prof. E. G. R. Waters, M.A., F.E.S. (Proc. and Report, Ashmolean Nat. Hist. Soc. Oxfordsh. for 1928, publ. Oxford, 1929.)
- 4A-4C. Tineina in the Oxford District, by Prof. Waters (E.M.M., Vol. LXI, 1925, p. 188-4A; LXIII, 1927, pp. 69, 99-4B; LXIV, 1928, p. 172-4C). This series of papers is continued from Vol. LX, 1924, p. 103.
5. Observations on *Glyphipteryx schoenicolella* Boyd, by Prof. Waters. (*Ibid.*, LXIV, 1928, p. 252.)
6. A New Coleophora of the Rush-feeding Group, by Prof. Waters. (*Ibid.*, LXV, 1929, p. 1.)
- 6A. The Genitalia of *Coleophora murinipennella* Dup., and Allied Species, with Plate I, by O. W. Richards, M.A., F.E.S. (*Ibid.*, p. 3.)
7. Notes on some Species of *Lithocolletis*, with an Addition to the British List, by Prof. Waters. (*Ibid.*, p. 163.)
8. A New *Nepticula* from North Wales, by Prof. Waters. (*Ibid.*, LXIV, 1928, p. 105.)
9. Notes on the Nepticulidae, by Prof. Waters. (*Ibid.*, p. 219.)

10. *Nepticula albifasciella* Hein. : its Early Stages and its Occurrence in Britain, by Prof. Waters. (*Ibid.*, LXIV, 1928, p. 248.)
11. Occurrence of *Cucullia lactucae* W.V., at Oxford, by J. J. Walker. (*Ibid.*, LIX, 1923, p. 8.)
12. Occurrence of *Danaida plexippus* L., in Recent Years at Oxford, by J. J. Walker. (*Ibid.*, LXIV, 1928, p. 90.)
13. *Meloe rugosus* Marsh., near Oxford, by J. J. Walker. (*Ibid.*, p. 89.)
14. *Ptinus sexpunctatus* Panz., bred from the Cells of the Bee *Osmia rufa* L., in Oxford, by A. H. Hamm, A.L.S., F.E.S. (*Ibid.*, LX, 1924, p. 29.)
15. Some Coleopterous Remains from the Peat-bed at Wolvercote, Oxfordshire, by K. G. Blair, B.Sc., F.E.S. (Trans. Ent. Soc. Lond., 1923 (1924), p. 558.)
16. Captures of Tachinidae in the Oxford District during 1925, by Joseph Collins. (E.M.M., Vol. LXII, 1926, p. 60.)
17. New Species of *Limosina* (Diptera) allied to *L. crassimana* Hal., with Plate II, by O. W. Richards, M.A., F.E.S. (*Ibid.*, LXIII, 1927, p. 34.)
18. Obituary Notice of Francis Cardew Woodforde, B.A., F.E.S., by J. J. Walker. (*Ibid.*, LXIV, 1928, p. 237.) See also Hope Reports, Vol. xviii, No. 9, Trans. Ent. Soc. Lond., 1928, p. 523.
19. Some notes on the Collection of British Macro-Lepidoptera in the Hope Department of the Oxford University Museum, by the late F. C. Woodforde, B.A., F.E.S., Exeter Coll., Oxford (Entomologist, Vol. LVIII, 1925, p. 177). Concluded from Vol. LV, 1922, p. 14. (Hope Reports, Vol. x, Nos. 23A—23E.)
20. Notes on the Series of *Peronea cristana* in the Dale Collection, and on the Type-specimen of *ab. gumpinana* Johnson, included therein, by W. G. Sheldon, F.E.S. (*Ibid.*, LVIII, 1925, p. 2.)
21. British Orthoptera in the Dale Collection. II. Grasshoppers, by W. J. Lucas, B.A., F.E.S. (E.M.M., Vol. LXI, 1925, p. 246.) Concluded from Vol. XLVII (Ser. 2, xxii), 1911, p. 138. (Hope Reports, Vol. viii, No. 23.)
22. Report of the Hope Professor of Zoology, 1915—1922.
23. " " " " " 1923.
24. " " " " " 1924.
25. " " " " " 1925.
26. " " " " " 1926.
27. " " " " " 1927.
28. " " " " " 1928.

THE ENTOMOLOGY OF THE OXFORD DISTRICT

INTRODUCTION

BY JAMES J. WALKER, R.N.

FOR many years past Oxford has been recognised as one of the most important centres of Entomological study and research in the kingdom ; and there are few if any of our cities that present so many advantages to the student of that fascinating branch of Natural History, the economic importance of which has been so fully recognised in recent times. The constant succession of enthusiastic young Entomologists supplied by the University has found here, besides a delightfully varied and productive field in the surrounding country for their collecting and observing energies, the most ample resources for more serious study in the great collections and library housed in the ' Hope Department ' of the University Museum. The coming to Oxford of John Obadiah Westwood, the foremost Entomologist of his day, as the first ' Hope Professor of Zoology ' is a landmark in the history of the science ; and under his fostering care, and even more so under that of his distinguished successor in the Chair, Professor E. B. Poulton, the collection of insects of all Orders in the University Museum has grown to such an extent in richness and completeness, that it now ranks second only in importance to the National Collection at South Kensington.

The insect fauna of the British Islands is here very fully represented, as a number of important collections of all Orders of more or less modern date, including in some cases a large amount of first-rate local material, have been acquired by bequest or otherwise, and have been incorporated with the nucleus formed by the collections of the Rev. F. W. Hope and Professor Westwood. Another collection of British insects of very great historic interest, formed by the well-known entomologists, J. C. Dale and his son C. W. Dale, and dating in its inception from the beginning of last century, was bequeathed to the Museum by the latter in 1906, and remains in its original cabinets and arrangement under the terms of his will.

Much good Entomological work was done between 1857 and 1872, under the auspices and guidance of Professor Westwood, by the Oxford University Entomological Society, which has left a very useful memento of its existence in the *Accentuated List of British Lepidoptera*. This Association, after the lapse of half-a-century, has been revived with marked success under the same title with Professor E. B. Poulton as its head, and many papers of high merit have been read at its meetings. There has also never been wanting a succession of able resident entomologists in the City, and as a consequence of the close and energetic research that these and others have carried on during recent years, it may be confidently stated, as regards nearly all Orders of Insects, that very few if any districts of the same extent have been so thoroughly and exhaustively worked, as that of which the ancient City of Oxford is the centre.

ORTHOPTERA

BY W. J. LUCAS

IN the past this Order of Exopterygote insects has been much neglected, consequently records are comparatively few, and therefore, seeing what a diversity of surface and soil is to be found on both sides of the City, in Oxon and Berks, anyone taking up the study of the Order has much virgin soil in which to work. Although a good proportion of our thirty-eight species has been discovered, the records known to me are not very numerous. They are as follows :

Suborder **Forficulodea** (Earwigs).—*Labia minor* Leach has been recorded for Tubney and Aldworth in Berks, but is really quite common in and around the City : it was once found in great abundance at Watereaton near Oxford. *Forficula auricularia* Linn. is no doubt ubiquitous ; the var. *forcipata* Steph. is fairly common, especially at Tubney. The somewhat rare *F. lesnei* Finot has been taken at Streatley, Cothill, near Wallingford, and near Reading in Berks ; at Beckley and Headington Wick in Oxon. A specimen in the Hope Department is labelled ‘ Kingston in hedges, 1840.’ *Apterygida albipennis* Meg. probably only awaits a discoverer.

Suborder **Blattodea** (Cockroaches).—*Ectobius lapponicus* Linn. has occurred in Bagley Wood (probably), at Sunning Hill (Hope Coll.), and near Reading (Curtis). *Blattella germanica* Linn. was at one time recorded as present in the Randolph Hotel kitchen : it is, in fact, common in many places in the City. *Blatta orientalis* Linn. is no doubt generally distributed. The colonist *Periplaneta australasiae* Fabr. is fairly common in a hothouse at Headington Hill, Oxford ; but its congener *P. americana* Linn. has not yet been reported. *Leucophaea surinamensis* Linn. is

common in a hothouse at Thame Park. The casual *Blabera cubensis* Sauss. has twice been taken in the City; and green Panchloras are imported commonly in bananas.

Suborder **Gryllodea** (Crickets).—*Gryllotalpa gryllotalpa* Linn. (the Mole Cricket) has been captured at Besselsleigh in Berks, and near Oxford. *Gryllus domesticus* Linn. is no doubt fairly general, though probably decreasing in numbers as is so often the case now. The other two crickets are not very likely to occur.

Suborder **Locustodea** (Long-horned Grasshoppers). *Pholidoptera griseoaptera* De Geer has been taken at Shotover, Bagley Wood, Streatley, Tubney, Goring, and in 1876 in Professor Westwood's garden. *Metriopectera brachyptera* Linn. should certainly occur at other localities besides Wellington Coll., Berks. It seems to like heaths that are not too dry. That fine insect, *Phasgonura viridissima* Linn., has been captured at Tubney, Streatley, and Chilswell Hill; at Islip, near Binsey, in the 'Parks,' and at Lye Hill near Cowley. The single record for the marsh-loving *Canocephalus dorsalis* Latr. is from Tubney. The green 'grasshopper' of the trees, *Meconema thalassinum* De Geer, which is probably distributed generally, has been detected in Berks at Streatley, Wytham, and Tubney Wood; in Oxon in the Museum grounds, at Stonesfield, Witney, Milton-under-Wychwood, Woodstock, and Watereaton. The spider-like *Leptophyes punctatissima* Bosc has been taken in Bagley Wood, and is not uncommon at Cowley and Shotover. The other three species of the suborder are scarcely to be expected.

Suborder **Acridiidea** (Short-horned Grasshoppers).—*Tetrix subulatus* Linn. is recorded from Tubney (var. *stylifer* Luc.), Wytham, Yarnton, near Cowley, Open Brasenose Common, and Bayswater Mill; its congener, *T. bipunctatus* Linn., from Tubney, Streatley, Yarnton,

Wantage, and near Henley. *Gomphocerus rufus* Linn. has been reported for Berks, but not for Oxon. The very variable *G. maculatus* Thunb. has been taken at Besselsleigh, Tubney, and Henley. Stanton St. John (Oxon), Wytham, Bladon (Oxon), and Henley are localities for *Omocestus viridulus* Linn. The very common species, *Stauroderus bicolor* Charp., has been found on Chilswell Hill, at Tubney, on the White Horse Hills near the 'Blowing Stone' and Letcombe Basset, on Shotover Hill, at Henley (with one var. *longitudinalis* Luc.), etc. The only record for the somewhat infrequent *Chorthippus elegans* Charp. is Crookham Common near Newbury. Its far commoner congener, *C. parallelus* Zett., has been taken there also, as well as at Chilswell Hill, Yarnton, Shotover Hill, Wantage, and near the 'Blowing Stone' and Letcombe Basset; while there is one from Blenheim Park (1832) in the Hope Department. *Stenobothrus lineatus* Panz. and *Omocestus rufipes* Zett. may be looked for, but *Mecostethus grossus* Linn. is not very likely to occur.

Without definite localities, Burr records from the neighbourhood of Radley College *B. germanica*, *M. griseoaptera*, *M. thalassinum*, *L. punctatissima*, *T. subulatus*, *T. bipunctatus*, *S. lineatus*, *O. rufipes*, *O. viridulus*, *S. bicolor*, and *C. parallelus*.

In addition to my own records, a large number are due to A. H. Hamm, and others to W. Holland, J. Collins, M. Burr, J. R. Tomlin, J. J. Walker, H. Donisthorpe, A. J. Chitty, W. L. Distant, J. W. Shipp, H. Scott, and C. Morley.

PSOCOPTERA

BY W. J. LUCAS

In the Hope Department of the University Museum there are a number of insects belonging to this Order, collected by

H. Britten from 1914 to 1917, as well as a few due to A. H. Hamm. From these, under a more recent nomenclature, the following list is compiled.

Amphigerontia variegata Latr., on fence, Headington Hill; *A. fasciata* Fabr., on poplar, Shotover Hill; *A. bifasciata* Latr., on larch, Shotover Hill; *Psocus quadrimaculatus* Latr., on wall, Headington Hill; *P. sexpunctatus* Linn., on fence, the Parks and Headington Hill; *P. nebulosus* Steph., on sloe, Shotover Hill; *P. longicornis* Fabr., on fence, Headington Hill; *Stenopsocus immaculatus* Steph., on fence, Headington Hill; *S. stigmaticus* Imhoff, on hawthorn, the Parks; *Graphopsocus cruciatus* Linn., on fence, Headington Hill; *Mesopsocus unipunctatus* Müll., on fence, Headington Hill; *Philotarsus flaviceps* Steph., on sloe, Shotover Hill; *Elipsocus hyalinus* Steph., on sloe, Shotover Hill; *E. westwoodi* M'Lach., on fences, etc., generally distributed; *Pterodela pedicularia* Linn., on pine, Shotover Hill; *Peripsocus subpupillatus* M'Lach., on fence, Headington Hill; *P. phaeopterus* Steph., on spruce, the Parks, and on sloe, Shotover Hill; *Ectopsocus briggsi* M'Lach., on pine branches, Shotover Hill; *Caecilivus fuscopterus* Latr., by sweeping, Open Brasenose Common; *C. flavidus* Steph., by beating, Headington Wick Copse; *C. obsoletus* Steph., on spruce, the Parks; *C. burmeisteri*, Brauer, on spruce, the Parks; *C. perlatus* Kolbe, on poplar, Bayswater Mill near Oxford; *Trichopsocus dalei* M'Lach., on wall, Headington Hill; *Atropos pulsatoria* Linn., Pharmacology Department, Univ. Museum; *Leptinotus inquilinus* Heyd., Hope Department, Univ. Museum; *Troctes divinatorius* Müll., Hope Dept., Univ. Museum.

EPHEMEROPTERA

BY W. J. LUCAS

Of this unique Order of insects we have about forty British species, of which only some thirteen (chiefly owing to A. H. Hamm's exertions) have been detected in the Oxford district. Here is work for some young entomologist seeking 'fresh woods and pastures new' in which to make discoveries.

Ephemera vulgata Linn. has been recorded from the Thames about Godstow, Binsey, and King's Weir, the canal at Oxford, and Woolhampton; the fairly common species, *E. danica* Müll., no nearer than Reading. *Leptophlebia marginata* Linn., a common species, has occurred by the Thames above Godstow and between Iffley and Oxford, Magdalen Bridge, the Parks, and the Museum grounds; *L. submarginata* Steph. at Hogley Bog near Cowley. *Habrophlebia fusca* Curtis has been taken on Magdalen Bridge. *Ephemerella ignita* Poda was captured (a male) at Oxford in 1909. *Baëtis binoculatus* Linn. is recorded from Hogley Bog; and *B. rhodani* Pict. from the same bog and from the Museum. *Centroptilum luteolum* Müll. has been taken at Godstow, Iffley Road, Canal at Oxford, Hogley Bog, the Parks, the Museum, and the Cherwell at 'Mesopotamia'; *C. pennulatum* Eaton on the Thames side near Oxford. *Cloëon dipterum* Linn. is recorded from Shotover, 'Mesopotamia,' and the Museum; *C. simile* Eaton in a garden near Cowley Road and in the Parks; *C. rufulum* Müll. in Iffley Road. *Ecdyurus volitans* Eaton has been found at the Thames side above Godstow. On 25th May, 1913, *C. luteolum* was seen migrating from west to east in swarms at 8.30 p.m.

PARANEUROPTERA (DRAGONFLIES)

BY W. J. LUCAS

Of the forty-two species of dragonflies at present known to be British, some twenty-two have been detected in Oxon and Berks, and are therefore within the range of Oxford entomologists. Many are quite common insects, and must have a far more general distribution than is here indicated; one or two of them are rather less common. Of the remaining twenty it may be taken as certain that a few species remain to be discovered, though several, on the other hand, are not likely to occur.

SUBORDER Anisoptera

ÆSCHNIDAE.—The somewhat local *Gomphus vulgatissimus* Linn. has been recorded from Brighthampton, Thames below Eynsham (naiad), Shotover (seen only) in Oxon; and Bagley Wood, King's Weir, Eynsham (naiads), Thames above Godstow, and near Reading in Berks. *Cordulegaster annulatus* Latr. should be found nearer Oxford, but the only records are Wellington Coll. and near Reading. *Brachytron pratense* Müll. has been met with in the Parks, on the Cherwell, at Cowley Marsh, and at Radley. *Aeschna grandis* Linn. is common throughout the district: Southleigh and Brighthampton in Oxon; and Bagley Wood, S. Hinksey, and near Eynsham in Berks, have been definitely recorded. For *Ae. juncea* Linn. near Bagley Wood is so far the only known locality. The rather infrequent *Ae. mixta* Latr. has occurred at Southleigh and Maidenhead. Southleigh and Bagley Wood are recorded for *Ae. cyanea* Müll., but it is really common in the district.

LIBELLULIDAE.—The rather uncommon *Cordulia aenea*

Linn. is on record only for Wellington Coll. and Bulmershe Park near Reading. The 'wanderer,' *Libellula quadrimaculata* Linn., has occurred at Shotover, Southleigh, Dry Sandford, and Bulmershe Park. That common dragonfly, *Libellula depressa* Linn., was found a year or two ago in abundance, emerging from a pond on Open Brasenose Common; but strange to say there are no other records for the Oxford neighbourhood. *Orthetrum caeruleum* Fabr. has been met with at Cowley. The very common *Sympetrum striolatum* Charp. has been recorded for the Oxford district at Shotover Hill, Cowley Marsh, Southleigh, and Brighthampton in Oxon; near Bagley Wood, at Kennington, Eynsham, and Godstow in Berks. A male *S. flaveolum* Linn., a migrant, was taken on 21st August, 1898, near Oxford.

SUBORDER Zygoptera

CALOPTERYGIDAE.—*Calopteryx virgo* Linn. has been met with at Tubney Wood, Brighthampton, and other more distant localities in Oxon and Berks. *C. splendens* Harris occurs on the Cherwell, in the Parks and even in the Museum Grounds, at Brighthampton, near Eynsham, on the Thames near Nuneham, at Sulhampton, and King's Weir. This seems to be specially a Thames dragonfly.

AGRIONIDAE.—*Platynemis pennipes* Pall. is abundant on the Thames, and on the Cherwell near Oxford where a few of the var. *lactea* Charp. have been detected. It frequently occurs in the Parks and in the Museum Grounds. Other localities are King's Weir, Bablockhythe, Brighthampton, and near Eynsham. The well-named *Ischnura elegans* Lind. is recorded for Worcester and Magdalen College gardens, the Cherwell near Oxford, near Eynsham, the Thames near Kennington, King's Weir (with a var. *rufescens* Leach), Tubney, and Radley College. *Agrion*

pulchellum Lind. has been found at Old Marston, Godstow, the Cherwell near Oxford, and at King's Weir. *Agrion puella* Linn. is recorded for Cowley Marsh, Shotover Hill, the Cherwell near Oxford, Yarnton. Southleigh, Bright-hampton, Tubney, above King's Weir, and Thames side near Kennington. The somewhat local *Erythromma najas* Hans. has been found in the Thames below Eynsham (naiads) and at King's Weir. *Pyrrosoma nymphula* Sulz., the early crimson dragonfly, is recorded for Cowley Marsh and Bog, Shotover (commonly), Boar's Hill, and Tubney. King's Weir is the only locality so far for the usually common little dragonfly *Enallagma cyathigerum* Charp.

Besides the above, *Anax imperator* Leach, *Libellula fulva* Müll., *Orthetrum cancellatum* Linn., *Sympetrum sanguineum* Müll., *S. scoticum* Don., *Lestes sponsa* Hans., and possibly *Somatochlora metallica* Lind., should reward anyone working our Paraneuroptera from Oxford as a centre. The remaining species may scarcely be hoped for.

In addition to those made by myself, the above records are due to A. H. Hamm, A. East, W. Holland, Prof. E. B. Poulton, J. E. Tarbat, M. Burr, P. Harwood, F. A. Walker, H. Trim, R. M'Lachlan, G. T. Porritt, H. R. Smith, J. E. P. Smith, and Mr. Stone.

NEUROPTERA

By W. J. LUCAS

Of the Neuroptera, perhaps the oldest Order of Endopterygote insects, a fair number of the sixty-two species known as British are on record for the district; but the number of individual localities is very limited. So interesting and beneficial a group of insects merits greater attention at the hands of entomologists.

Alder-flies.—The common species, *Sialis lutaria* Linn., has occurred at the canal-side near Oxford, river-side near Binsey and above Godstow, Magdalen Bridge, Shotover, and Cowley; the less common *S. fuliginosa* Piet. has not yet been detected.

Snake-flies.—*Raphidia notata* Fabr. has been taken at Stanton St. John, and farther afield in the neighbourhood of Reading; while the little *R. maculicollis* Steph. is to be found at Shotover, Bagley Wood, Tubney, and elsewhere.

Brown Lace-wings.—The largest, *Osmylus chrysops* Linn., unfortunately has not yet been taken nearer than Wokingham. It haunts shady streams. *Sisyra fuscata* Fabr., whose larva lives within the Freshwater Sponge, has been found in the Parks, near Marston Ferry, and on the river-side near Binsey and above Godstow. *Hemerobius micans* Oliv. has been recorded for Oxford, Shotover, and Hogley Bog; *H. nitidulus* Fabr. for the Parks; *H. humuli* Linn. for Boar's Hill and Bagley; *H. lutescens* Fabr. for Shotover and Headington Wick; the common *H. stigma* Steph. no nearer Oxford than Wellington College; the scarce *H. pini* Steph. for Shotover. *Boriomyia nervosa* Fabr. has been found in the Parks and at Shotover; *B. subnebulosa* Steph. in the Parks and other places near the City. *Micromus paganus* Linn. has occurred at Headington Hill, and *M. variegatus* Fabr. at Yarnton and Bayswater Mill.

Green Lace-wings.—*Chrysopa flava* Scop. has been met with in the Parks; *C. alba* Linn. at Boar's Hill; *C. tenella* Sch. in Marston Lane and Fields; *C. vulgaris* Sch. at Ifley, Sandford-on-Thames, in Banbury Road, and in the Museum; *C. septempunctata* Wesm. in the Museum, and at Ferry Hinksey and East Ilsley. *C. ventralis* Curtis at Tubney Wood; the somewhat recently discovered *C. dorsalis* Burm. not uncommonly on pine and larch in Bagley

and Tubney Woods; the common *C. perla* Linn. on the canal-bank near Oxford and river-side near Kennington and King's Weir.

Dusty-wings.—*Semidalis aleurodifformis* Steph. has been reported from Open Brasenose Common and Shotover; *Coniopteryx tineiformis* Curtis from the Parks and Shotover; *C. psociformis* Curtis from the Parks and Headington. There is, however, some confusion with regard to the British species of Coniopterygidae, and more attention to the family is required.

Scorpion-flies.—*Panorpa cognata* Ramb., a scarce insect, has recently been discovered at Cothill and Besselsleigh; it occurs also at Henley-on-Thames. *P. communis* Linn. has been taken at Yarnton, Shotover, Hogley Bog, Cowley, Tubney Wood, and E. Ilsley at least, while *P. germanica* Linn. has been found at Hogley Bog, Cowley, Stow, Tubney and Bagley Woods, at Boar's Hill, and on the river-side above Godstow.

Besides my own, these records are due to A. H. Hamm especially, and to Prof. E. B. Poulton, W. Holland, J. Collins and Dr. H. Scott.

TRICHOPTERA

BY W. J. LUCAS

As the British Trichoptera number almost two hundred species, it is clear that the following list for the Oxford district, so exceedingly well watered, is very unsatisfactory. The records that follow are mainly due to captures made by A. H. Hamm. They are:

Phryganea grandis Linn., common on Magdalen Bridge and elsewhere; *P. striata* Linn., Oxford; *Colpotaulius incisus* Curtis, the Parks, the Museum, and Iffley;

Grammotaulius atomarius Fabr., Shotover; *Glyphotaelius pellucidus* Retz., Coldharbour near Oxford; *Limnophilus rhombicus* Linn., Oxford; *L. lunatus* Curtis, river-side near Iffley and Port Meadow Stream; *L. vittatus* Fabr., Magdalen Bridge and elsewhere; *L. sparsus* Curtis, the Parks and Headington Wick; *Stenophylax permistus* M'Lachlan, Oxford, the Museum, the Parks, and Headington Common; *Halesus digitatus* Schr., the Parks and Magdalen Bridge; *Sericostoma personatum* Spence, the Parks at 'Mesopotamia,' Iffley, and Magdalen Bridge; *Goera pilosa* Fabr., Iffley; *Leptocerus aterrimus* Steph., 'Mesopotamia'; *L. dissimilis* Steph., Magdalen Bridge; *Mystacides nigra* Linn., River near Kennington and Port Meadow Stream; *M. azurea* Linn., Magdalen Bridge; *Tinodes waeneri* Linn., river-side near Iffley.

HYMENOPTERA

BY A. H. HAMM

ACULEATA

THE bees, wasps and ants form, without doubt, one of the most highly specialised groups of insects in existence, especially in regard to the habits and economy of the social and solitary species.

A list of the Aculeata of the Oxford district was published in 1901 by the Ashmolean Society, jointly by Messrs. R. C. L. Perkins, L. Young and A. H. Hamm. Since that time many additions have been made by the writer, and a few by Messrs. J. Collins and O. W. Richards. During the past few years Dr. Perkins, F.R.S., has studied the British bees and wasps extensively, and revised practically the whole group. This revision has involved considerable alteration in arrangement and nomenclature, and British Hymenopterists owe him a deep debt of gratitude for his labours. He has also recently published an excellent list of the Aculeata for the County of Devon, and the writer has, with his permission, adopted his classification in the brief list now given for this district. To Mr. H. Donisthorpe, F.Z.S., etc., we are indebted for a very valuable and comprehensive work on *British Ants*, published in 1915. The species mentioned below represent only a few of the more interesting forms of the Order met with in the District.

APOIDEA

Hylaeus (Prosopis) cornutus Sm. occurs at Shotover and Tubney; and *H. pictipes* Nyl. in the University Parks. *Colletes fodiens* K., University Parks, Bagley and Tubney Woods; *C. glutinans* Cuv. is not uncommon at heather bloom, Boar's Hill. At Tubney, *Andrena hattorfiana* F., *A. fulvago* Christ. and *A. nigriceps* K. are not rare, whilst *A. spreta* Perèz and *A. humilis* Imh. can always be relied upon in their season; and the ♂ of the rare *A. bucephala* Steph. has recently been taken on Boar's Hill by Mr. O. W. Richards. *Cilissa leporina* Panz. is generally distributed. A large number of species of *Halictus* are to be found in the district, of which *H. xanthopus* K. and *H. laevigatus* K. are rare at Boar's Hill, as is *H. punctatissimus* Sch. at Shotover. *Sphecodes pellucidus* Sm., *S. ferruginatus* v. Hag and *S. variegatus* v. Hag. are sometimes not uncommon at Shotover and Tubney; these and many other species of *Sphecodes* are mainly parasitic on *Halicti*. The fine and conspicuous bee *Dasygaster hirtipes* Ltr. has only been found at Tubney, where *Nomada armata* H.-Schff. is sometimes not uncommon, associating with *A. hattorfiana*; *N. atrata* Sm. with *A. marginata* F. and *N. tormentillae* Alf. with *A. tarsata* Nyl., while *N. germanica* Panz. is taken not rarely near Shotover with *A. humilis*. *Epeolus variegatus* L., not rare about the burrows of *C. fodiens* at Boar's Hill and Tubney. *Anthophora retusa* L. occurs not rarely at Shotover and Boar's Hill; and *A. furcata* Panz. is to be found frequenting Labiate flowers not uncommonly. *Eucera longicornis* L. is not common, but has been taken near Shotover and at Tubney. *Coelioxys rufescens* Lep. is local and scarce, but *C. elongata* Lep. and *C. acuminata* Nyl. are not uncommon. *Anthidium manicatum* L. can usually be found in and near the City wherever *Stachys* or *Ballota* is in bloom. The

parasitic *Stelis aterrima* Panz. is fairly common, whilst *S. phaeoptera* K. and *S. ornatula* Kl. are both rare, the former at Tubney, the latter near Wytham. The pretty *Osmia bicolor* Sch., which nests in empty snail shells, may be found in Bagley Wood and on Shotover Hill; *O. pilicornis* Sm. is partial to the flowers of the bugle (*Ajuga reptans*) in Hen Wood; *O. aurulenta* Panz. has occurred on several occasions in Bagley Wood, and recently in Holton Stone Pits. Fourteen species of *Bombus* are found more or less commonly throughout the district, of which the rarest are *B. soröensis* F., *B. jonellus* K. and *B. distinguendus* Mor. These have occurred only on a few occasions.

SPHECOIDEA (FOSSORES PART)

The well-known *Sphex sabulosa* L. and *S. campestris* Ltr. have both been taken at Tubney rarely, and the former species singly in the Museum Grounds. The rare *Cerato-phorus morio* V. d. Lind. has occurred near Bayswater Mill. The minute *Spilomena troglodytes* V. d. Lind. has been taken on an old post in the writer's garden, Southfield Road. The Crabronidae are well represented, twenty-eight species having been found within the district; those of more than passing interest being *Clytochrysus sexcinctus* F., University Parks and Holywell Street; *Solenius larvatus* Wesm., Shotover and Tubney; *Metacrabro lituratus* Panz., Bagley Wood and Tubney; *Acanthocrabro vagabundus* Panz. and *Cuphopterus dimidiatus* F., Lye Hill; *Blepharipus nigratus* Lep. near Shotover and Tubney; *B. styrius* Kohl., Headington; *B. gonager* Lep., near my garden, nesting in rotten wood; *Rhopalum tibiale* Lep., The Weirs. A male of the scarce *Didineis lunicornis* F. was taken on an umbellifer near Horspath. The very local and usually maritime *Mellinus sabulosus* F. is sometimes quite abundant on Lye Hill, Shotover, and at Tubney. *Cerceris ornata* F. and *C.*

interrupta Panz. are both fairly common at Tubney, where *Tachysphex unicolor* Panz. and *Astata stigma* Panz. are not uncommon.

VESPOIDEA

Psammochares (*Pompilus*) *minutulus* Dahlb., *P. chalybeatus* Sch., the recently-described species *P. cardui* Perk. (which was taken as far back as 1907, but recorded in error as *P. approximatus* Sm.), and *Evagethes bicolor* Lep. have all occurred in and around the sand-pit at Tubney. *Salix notatulus* E.S. is rare, but the usually scarce *S. obtusiventris* Schiödte is sometimes quite common. The robber *Ceropaes maculatus* F. has been observed in the attempt to deprive *Psammochares plumbeus* F. of its prey, a spider, at Tubney. *Vespa crabro* L. is rare, odd specimens only having been met with; *V. norvegica* F., Shotover and Bagley Wood, is not common; whilst the parasitic wasp *V. austriaca* Panz. is decidedly rare. The scarce *Odynerus bifasciatus* L. is found on Shotover Hill. *Ancistrocerus laevipes* Shuck. is not uncommon at Shotover and Tubney; while *A. antilope* Panz. is rare. The rare and local *Sapyga clavicornis* L., which first made its appearance in the district a few years ago in the writer's garden, and has since appeared yearly; it has, however, been taken recently, not uncommonly, near Bagley Wood, by O. W. Richards. The small *Mutilla rufipes* Ltr. is not rare in Tubney sand-pit. The *Chrysididae* are also very well represented, fifteen species out of twenty-four occurring in the district. *Ellampus caeruleus* Dhlb. and its var. *virens* Mocs. from Tubney is rare. *Hedychridium integrum* Dhlb. associating with *Astata stigma* Panz. and *Hedychrum nobile* Scop. is almost certainly parasitic on *Cerceris interrupta* Panz. are not uncommon at Tubney. The fine *Chrysis pustulosa* Ab. is not rare about old posts where *Osmia ventralis* Panz. is

nidificating, and the scarce *C. ruddii* Shuck. has several times been bred from the mud cells of *Odynerus*.

FORMICOIDEA.

In the ants, the rare *Formicoxenus nitidulus* Nyl. has once been taken by Mr. J. Collins, from a nest of *Formica rufa* L. at Tubney, where *Stenamma westwoodi* Westw. has occurred on several occasions, and *Tetramorium caespitum* L. once to Mr. H. Donisthorpe.

Divisions.	Species occurring in Britain.	Species recorded from Devon. ²	Species observed in the Oxford District.	Percentage of British species occurring in the Oxford District.
Apoidea - -	221	180	146	66·0
Sphecoidea - -	87	68	72	82·7
Vespoidea ¹ - -	85	61	57	67·0
Formicoidea - -	35	20	16	45·7
Total - -	428	329	291	68·0

PHYTOPHAGA (SAWFLIES)

No serious attempt has so far been made to compile a list of the Sawflies of the Oxford District, but the writer has collected these insects in a somewhat desultory manner for many years past, and has thus obtained nearly 200 species in all. His best thanks are due to Dr. R. C. L. Perkins, M.A., F.R.S., and the Rev. F. D. Morice, M.A., F.E.S., for the determination of a large number of the

¹ This now includes the *Chrysididae*.

² These figures are taken from the recently-published list for the County of Devon, by Dr. R. C. L. Perkins, F.R.S., which is the only one extant under the revised arrangement and nomenclature.

more interesting local forms, of which a brief list is here given.

Pamphilius sylvaticus L., *P. depressus* Vill. and *P. hortorum* Klug; of these the first-named is the commonest, occurring at Shotover and Boar's Hill. *Cephus pygmaeus* L. and *C. tabidus* F. are both common. Of the rare and curious *Xiphydria prolongata* Geoffr., two females have been obtained, one by Commander Walker on a post near King's Weir, between Godstow and Eynsham, and the other by Mr. J. Collins in his house at Sunnymeade, North Oxford. The conspicuous *Sirex gigas* L., which is so often mistaken by non-entomologists for a hornet, is of frequent occurrence, even in the City; many of the specimens are no doubt imported in scaffold-poles and other foreign timber, but the writer has taken it among spruce and larch trees in Tubney Wood, evidently 'at home' there. *Sirex noctilio* F. is much rarer; a fine female was once picked up in the grounds of the University Museum. *Cimbex femorata* Panz. has been bred from birch, and *Trichiosoma lucorum* L. and *T. tibialis* Steph. more frequently from hawthorn. *Abia sericea* L. and *A. fasciata* L. are both scarce, but *A. nigricornis* Leach is not uncommon on Shotover Hill; of the genus *Arge*, *coerulescens* Geoffr., *ustulata* L. and *cyanocrocea* Först. are not rare, especially the last-named. *Priophorus padi* L. has been taken in the City and at Shotover; *Dineura stilata* Klug and *Pteronidea nigricornis* Lep. at Bagley Wood; *Trichiocampus ulmi* L. at Hogley Bog, and *Cryptocampus afer* Jur. at Shotover. *Pteronidea ribesii* Scop. is a serious pest at times on gooseberry bushes. *Pteronus oligospilus* Först, *P. myosotidis* F., *P. leucotrochus* Htg., and *Holcocneme lucida* Panz. are not uncommon, and *Croesus latipes* Vill. from Shotover, *Platycampus luridiventris* Fall. from Bayswater Mill, Oxon; *Pachynematus capreae* F., University Parks; *P. vagus* F.,

P. trisignatus Först, *P. obductus* Htg., and *P. cinersbergensis* Htg., all these last, from Shotover and Boar's Hill, deserve mention. *Lygaenematus tricalis* Först, *Micronematus monogyniae* Htg., and *Eriocampoides annulipes* Klug have also been taken at Shotover. *Phyllotoma vagans* Fall. has occurred at Hogley Bog, and *Pristiphora pallidiventris* Fall., *Hoplocampa crataegi* Klug, *H. pectoralis* Thoms. and *H. rutilicornis* Klug are more or less frequently met with, while *H. testudinea* Klug often does serious damage to the crop of apples.

Phymatocera aterrima Klug was regarded as a rare insect until quite recently, but it has now become quite a pest in the University Parks and the College Gardens, the larvae practically destroying their food-plant, Solomon's Seal (*Polygonatum multiflorum* and *verticillatum*). *Blennocampa alternipes* Klug, *B. affinis* Fall., *B. pusilla* Klug, *Tomostethus dubius* Gmel., *T. luteiventris* Klug, *T. fuliginosa* Schr., *T. nigrilis* F. and *T. ephippium* Cam., are all to be found at Shotover; *Monophadnus albipes* Gmel. is generally common, *M. ruficruris* Brullé and *M. geniculatus* Htg. being much rarer. *Fenusa dohrni* Tischb. occurs at Hogley Bog, and *Athalia lineolata* Lep. is everywhere abundant; *A. glabricollis* Thoms. is not uncommon at Shotover and Cothill, and *A. lugens* Klug is apparently scarce. *Selandria stramineipes* Klug and *S. serva* F. are both common; *S. morio* F., which occurs at Shotover and Bagley Wood, is decidedly rare. *Strongylogaster cingulatus* F. is plentiful, *Thrinax macula* Klug has been taken on Lye Hill near Cowley, and *Eriocampa ovata* L. is found freely on alder. *Empria excisa* Th., *E. abdominalis* F. and *E. immersa* Klug occur at Shotover, the Parks and Bagley Wood respectively. *Emphytus cinctus* L. is a common species in the district, *E. calceatus* Klug, *E. grossulariae* Klug, *E. succinctus* Klug and *E. serotinus* Klug being much less so. The most

abundant species of *Dolerus* are *D. madidus* Klug and *D. coruscans* Konow; *D. pratensis* L., *D. aericeps* Thoms., *D. palustris* Klug, *D. aeneus* Htg., *D. sanguinicollis*, *D. nigratus* Müll., *D. picipes*, Klug, *D. gonager* F., and *D. halma-todes* Schr. are all much scarcer. *Loderus palmatus* Klug is also apparently rare, its congener *L. vestigialis* Klug being abundant everywhere. *Rhogogaster fulvipes* Scop., *R. aucupariae* Klug, *R. viridis* L. and *R. punctulata* Klug are all of more or less frequent occurrence; *Tenthredopsis litterata* Geoffr. and its variety *microcephala* Lep. being plentiful; and *T. coqueberti* Klug, *T. campestris* L., *T. tiliae* Panz., *T. tristis* Cam. and *T. excisa* Th. all occurring sparingly. *Pachyprotasis rapae* L. and *Macrophya neglecta* Klug are common; and *M. rufipes* L., *M. punctum-album* L., *M. albicincta* Schr., *M. blanda* F., *M. 12-punctata* L., and *M. annulata* F. are all somewhat rare. *Allantus scrophulariae* L. is common on figwort and *A. temulus* Scop. abounds on Umbelliferae; other common species of the genus are *A. omissus* Först. and *A. arcuatus* Först., *A. vespa* Retz. being decidedly scarce. *Tenthredo livida* L. and *T. mesomela* L. are both abundant.

Many species of Cynipidae have been collected or bred, but nearly all await identification. *Biorhiza terminalis* F. (forma *aptera* F.) is fairly common, and the conspicuous 'Bedegaur' gall, formed on wild and cultivated roses by *Rhodites rosae* L., may be met with almost everywhere. One of the very few British specimens of the conspicuous *Ibalia cultellator* Latr., which is parasitic on the Siricidae, was taken by the writer in 1907 in Tubney Wood.

PARASITICA (ICHNEUMON FLIES)

The amount of recent literature dealing with this extensive and important series of insects, available to the comparatively small number of students of the group in our

own country, has until quite lately been very limited. This deficiency, however, has in large measure been made good by the publication of Claude Morley's monumental work on *British Ichneumons* (5 vols. 1903-1913), and of many valuable papers on the allied Braconidae by the late Rev. T. A. Marshall and by Mr. G. T. Lyle, F.E.S., in the *Transactions of the Entomological Society of London* and the *Entomologist* respectively. The present writer has, during the past few years, accumulated much material from the Oxford District, both by breeding from known hosts and by general collecting, but the greater part of this still remains to be worked out. All the Ichneumonidae noted in this article have been determined by Mr. Claude Morley, F.E.S., to whom the writer's best thanks are due for ever-ready assistance; and Mr. G. T. Lyle has very kindly named the few Braconidae that are enumerated. In the former group, the nomenclature and arrangement is that adopted by Mr. Morley in his *British Ichneumons*.

ICHNEUMONIDAE

ICHNEUMONINAE.—*Protichneumon fuscipennis* Wesm. and *P. laminatorius* F. have been bred from the larvae of *Chaerocampa porcellus* L. and *C. elpenor* L. respectively. *Coelichneumon consimilis* Wesm. is fairly common, *C. impressor* Zett. occurring at Hogley Bog, *C. lineator* F. at Bagley Wood, and *Stenichneumon trilineatus* Gmel. at Boar's Hill. *Cratichneumon fabricator* F., *C. annulator* F. and *C. fugitivus* Grav. are found at Shotover, the first not rarely, and *C. gravenhorsti* Fonsc. has been taken near Oxford. *Melanichneumon leucomelas* Gmel. occurs on Boar's Hill and *M. dumeticola* Grav. on Shotover, *M. perscrutator* Wesm. being fairly common; *Barichneumon vestigator* Wesm. and the rare *B. angustatus* Wesm. are both from Tibney Wood. Shotover Hill has produced *Ichneumon*

confusorius Grav., *I. gracilentus* Wesm., and *I. xanthorius* Grav. and its variety *flavoniger* Grav., the last not rarely. *I. sarcitorius* L. is fairly common, and *I. latrator* F. may be found in abundance in winter in moss, tufts of grass, etc. *I. bucculentus* Wesm., *I. molitorius* Grav., and *I. albiger* Wesm. occur in Bagley Wood. *I. extensorius* L., *I. confusorius* Grav. and *I. melanotis* Holmgr. are common, females of the latter species being often found hibernating under loose bark. *Chasmias motatorius* F., *Ctenichneumon castigator* F., *C. divisorius* Grav., *C. messorius* Grav., *Spilichneumon occisorius* F., *Amblyteles amatorius* Müll., *A. palliatorius* Grav., *A. subsericans* Grav. and *Platylabus nigricollis* Wesm. have all been found on Shotover Hill, and Boar's Hill has produced *A. negatorius* F., *Herpestomus brunnicornis* Grav., and *Phaeogenes ischiomelinus* Grav. *P. melanogonus* Gmel. has occurred at Shotover, *P. stipator* at Horspath, Oxon, and *Dicaelotus rufilimbatus* Grav. in the University Parks. Hogley Bog and Yarnton have produced *Colpognathus divisus* Thoms., *C. celerator* Grav. and *Centeterus opprimator* Grav.; *Hemichneumon elongatus* Ratz. has been found at Shotover, and the males of *Alomyia debellator* F., the host of which common species is still not certainly known, are plentiful on Umbelliferous flowers in spring and autumn.

CRYPTINAE.—*Microcryptus abdominator* Grav. has occurred near Iffley, and *Acanthocryptus hopei* Morley, *Glyphicnemis brevis* Grav., *G. vagabunda* Grav. (fairly common, also at Tubney) and *G. erythogastra* Grav. at Shotover; also *G. profligator* F. at Hogley Bog. The females of *Phygadeuon fumator* Grav. may be found in abundance in grass-tufts in winter; *P. dumetorum* Grav., *P. variabilis* Grav. and *Hemiteles bicolorinus* Grav. occur at Shotover, *H. tristator* Grav. at Boar's Hill, and *H. areator* Panz. under loose bark in winter at Bagley Wood. Of the

ant-like and often apterous members of the genus *Pezomachus*, *P. instabilis* Först., a common species, has been bred from pupae of *Zygaena lonicerae* from Shotover, probably as a hyperparasite; *P. corruptor* Först., *P. attentus* Först., *P. intermedius* Först. from Hogley Bog; *P. intermedius* Först., *P. modestus* Först., *P. vagans* Oliv. from Yarnton; *P. acarorum* L., *P. kiesenwetteri* Först. from Bagley Wood; *P. zonatus* Först.; *P. fasciatus* F. from Shotover, *P. rufipes* Först. from Tubney, and *P. mülleri* Först. from Iffley, may be mentioned. *Cryptus obscurus* Grav. and *C. sponsor* F. have been met with at Shotover, and *C. apparitorius* Vill. at Tubney Wood.

PIMPLINAE.—*Ecthrus reluctator* L. has been taken in Oxford. Both sexes of *Rhyssa persuasoria* L., the largest of the British Ichneumonidae, whose usual host is *Sirex gigas* L., were taken in some numbers a few years ago by the present writer on a larch fence in the grounds of 'Youlbury,' Boar's Hill, and subsequently in Bagley Wood. *Ephialtes carbonarius* Christ., taken at Boar's Hill. *Perithous divinator* Rossi and *P. mediator* F. were bred from bramble stems gathered on Lye Hill, Oxford, which contained the nests of a Fossor, a species of *Pemphredon*. *Pimpla maculator* F., *P. examiner* F., *P. turionellae* L. and *P. brassicariae* Poda occur at Bagley Wood, and *P. detrita* Holmg. at Shotover, while the commoner *P. instigator* F. has been bred from the larva of *Clisiocampa neustria* L., *Glypta ceratites* Grav. has been taken at Shotover, *G. bifoveolata* Grav. at Horspath, and the rather rare *G. resinanae* Htg. from Charlbury, Oxon, may be included. *Stilbops chrysostoma* Grav. has been found at Hen Wood, Berks, and *Lissonota bellator* Grav., *L. variipes* Dsv. and *L. cylindrator* Vill. are all common on *Umbelliferae*. *Meniscus murinus* Grav. and *Collyria calcitrator* Grav. occur at Shotover, *Banchus falcator* F. at Tubney Wood, while

Exetastes cinctipes Ritz. is generally common, *E. nigripes* Grav. and *E. laevigator* Vill. being much scarcer.

TRYPHONINAE.—In this section may be mentioned *Bassus laetatorius* F., *B. tricinctus* Grav. and *B. albosignatus* Grav. from Hogley Bog; *Promethus festivus* F. and *Dyspetes praerogator* L. from Shotover; *Cutoglyptus fuscicornis* Gmel. taken in the City; *Perilissus filicornis* Grav. from Shotover and the Parks, and *Polyblastus pinguis* Grav. from Tubney Wood.

OPHIONINAE.—*Porizon exhaustator* F., a rare species, has occurred in Hogley Bog and on Boar's Hill, *Thersilochus jocator* F. at Tubney Wood, and *Agrypon anxium* Wesm. at Shotover. *Ophion luteus* L. is as usual common, but *O. obscurus* F. is much rarer, as is also *Paniscus virgatus* Fourc.

BRACONIDAE

Only a few of this extensive family of Parasitic Hymenoptera can be mentioned here, as the greater part of the material collected in the Oxford District still awaits identification. Nearly all the following species have been bred from Lepidopterous larvae by Mr. E. G. R. Waters, M.A., F.E.S., or from larvae and pupae of Diptera by the present writer.

From Lepidoptera.—*Apanteles albipennis* Nees, from *Colcophora troglodytella* Stn., and *Marasmarcha microdactyla* Hübn.; *A. tantillus* Marsh. from *Lithocolletis spinicolella* Stn.; *A. bicolor* Nees from *Stephensia brunnichella* L.; *A. viminetorum* W. from *Acrolepia pygmaeana* Haw., and *A. vestalis* Hal. from *Melitaea aurinia* Rott. *Microgaster tibialis* Nees from *Gracilaria tringipennella* Z.; *M. connexa* Nees, and its hyperparasite *Mesochorus pallidus* Brisch, from *Porthesia similis* Fuessl. *Acoelus subfasciatus* Hal. is the common parasite of many species of *Nepticula*.

Mirax spartii Hal. from *Nepticula septembrella* Stn. *Macrocentrus marginator* Nees from the 'Clearwing' *Sesia asiliformis* Rott. *Meteorus atrator* Curt. from a Tineid larva. *Ascogaster instabilis* W. from the cases of *Talaeporia pseudobombycella* Hüb. *Microplites spectabilis* Hal. from *Dyschorista upsilon* Bkh. and *Pygostolus sticticus* F. from an unknown larva.

From Diptera.—*Alysia manducator* Panz. is the parasite of the common blow-fly *Calliphora erythrocephala* Mg. *Phaenocarpa ruficeps* Nees, from the Anthomyid *Lasiops meadii* Kow. *Colastes braconius* Hal. from the Agromyzids *Phytomyza flava* Fln., *P. atricornis* Mg. and others of the genus; *Dacnusa aquilegiae* Marsh. from *P. aquilegiae* Hardy, and *D. areolaris* Nees from *P. angelicae* Kalt., *P. atricornis* Mg., etc. *Aspilota nervosa* Hal. from the Phorid *Aphiochaeta rata* Wood. *Phanomeris catenatus* has been bred from saw-fly larvae mining the leaves of *Potentilla*.

COLEOPTERA

BY JAMES J. WALKER, R.N.

ALTHOUGH the number of the students and collectors of our British Coleoptera, whose work has been centred at Oxford, is but small as compared with that of the Lepidopterists, the investigation of the local beetle-fauna may now be regarded as equally thorough and complete with that of the more favoured and popular Order of Insects. Our present knowledge of the beetles of the Oxford District is in great measure due to the assiduous and intensive collecting and observation which for many years have been carried on by the Entomological staff of the University Museum—Messrs. W. Holland, A. H. Hamm, H. Britten, and more especially Mr. J. Collins—in association since 1904 with the present writer. At the end of 1906 it was found possible to publish in the *Report of the Ashmolean Natural History Society of Oxfordshire* a ‘Preliminary List’ of 1399 species of Coleoptera occurring within a radius of seven miles from the centre of the City at Carfax; and five supplements to this list have been issued between 1907 and 1920 by the Society. Further additions have brought the number of recorded Oxford species to the very satisfactory total of 2120, or 59·3 per cent. of the 3570 species of Coleoptera at present enumerated as indigenous to the British Islands. Taking into account its restricted area and inland situation, the Oxford District may thus be regarded as exceptionally rich in this highly important Order of Insects, and in this

respect equalled by few if any localities of the same extent in our country.

Previous to the compilation of the 'Preliminary List,' a certain number of noteworthy beetles had already been recorded by earlier collectors, commencing with the Rev. F. W. Hope, the munificent founder of the 'Hope Department of Entomology' in the University Museum. His interleaved copy of Marsham's *Entomologia Britannica: Coleoptera*, now in the library of the Department, contains detailed notes of the capture of 130 species of beetles at Oxford made during the years 1819-1822, when he was an undergraduate of Christ Church. These include a good many interesting and uncommon forms, several of which have not since been recorded from the District; and two conspicuous beetles, *Necrophorus germanicus* L. and *Platycerus caraboides* L., both stated to have been taken at Wytham Park, Berks, still exist in excellent preservation in the Museum collection. Neither of these has occurred in this country for many years past, and they are omitted from all the recent catalogues of British Coleoptera. In the early volumes (1843-1850) of the now defunct *Zoologist* are records of some interesting species by Prof. J. O. Westwood, Mr. F. W. Holme, and the Rev. A. Matthews; and more recent notices of Oxford beetles by Mr. J. W. Shipp of the University Museum, an energetic and promising Coleopterist who unfortunately died at an early age, will be found in the *Entomologist's Monthly Magazine* and the *Entomologist* for the years 1892 and 1893.

The varied geological structure of the country round Oxford—divided as it is fairly equally between the counties of Berks and Oxon—and its exceedingly rich flora and extensive tracts of old and young woodland (some of which are now fortunately more accessible to the Naturalist than was formerly the case), are in favour of a large Coleopterous

fauna ; and the wide stretches of water-meadows along the Cherwell and the Isis are eminently suitable to those beetles which delight in a humid habitat. The river-banks themselves are as a rule difficult to work, but their productiveness is revealed whenever a flood of unusual height drives their Coleopterous inhabitants out of the recesses in which they lurk. On one such occasion, when a heavy flood in the Cherwell succeeded the still-remembered phenomenal spring snowstorm of 25th April, 1908, no fewer than 350 species of beetles, including many rarities, were 'listed' from a single accumulation of 'flood-rubbish' deposited by the river on Sparsey Bridge at Water Eaton. Such localities as Shotover Hill, Elsfield, Gibraltar Quarries near Kirtlington, and Wytham Park, where the soil is more or less calcareous, produce many local and rare forms of Coleoptera, the last-named locality being the headquarters in the District of the interesting family Anisotomidae, several notable species of these usually rare beetles being found by sweeping under the beech trees in the autumnal months. Close to Cothill is a large extent of damp thickets and marshy meadows, bearing a varied and most interesting flora, and including the 'Ruskin Reserve,' which may at all times of the year be visited with the certainty of some good captures. Another excellent locality of somewhat similar character, which lies a mile or more beyond the 'seven-mile radius,' but is included for the purposes of the local list, is the peat-bog at Weston-on-the-Green, famous for the number of rare and local species taken there by the Rev. A. Matthews about the middle of the last century. But the most productive regions in the whole area are the sandy fields and woods on Boar's Hill and near Tubney ; the latter locality has certainly received the greatest amount of attention from Coleopterists, and has produced the largest number of noteworthy beetles. A very remarkable

feature of Tubney is the presence of many species, always associated in our minds with seaside conditions, and met with inland, if at all, only on rare occasions. Such beetles as *Harpalus anxius* Duft., *Amara fulva* De G., *Homalota caesula* Er., *Xantholinus tricolor* F., *Orthocerus muticus* L., *Syncalypta hirsuta* Sharp, *Crypticus quisquilius* L., *Cteniopus sulphureus* L., and *Cleonus sulcirostris* L. are often as plentiful at Tubney as at Deal; the only other inland locality where such an assemblage of coast-frequenting species is found being the 'Breck Sands' district of Norfolk and Suffolk. It is greatly to be regretted that the headquarters of many of these interesting insects has been practically destroyed by the enclosure of Frilford Heath and its conversion into a golf-course; and in recent times the extension of building, and the taking-up of waste open places for pig- and poultry-farms, have ruined many other productive collecting-grounds.

The following table has been drawn up to show the number of genera and species in each of the obsolete (but for this purpose very convenient) primary divisions of the Coleoptera by Latreille, as represented in the fauna of the British Islands as a whole, and in that of the Oxford District. The number of British species has been corrected up to the end of last year (1925).¹

¹ This synopsis closely follows the classification adopted in the late Canon Fowler's standard work on *The Coleoptera of the British Islands* (1887-1891; Supplement, 1913), as well as in the *Catalogue of British Coleoptera* by Prof. Sir T. Hudson Beare and Mr. H. St. J. Donisthorpe (1904).

DIVISION.	FAMILIES.	No. of British.		No. in Oxford District.		Percentage in District.	
		Genera.	Species.	Genera.	Species.	Genera.	Species.
GEODEPHAGA - -	Cicindelidae and Carabidae -	64	329	43	174	67·1	52·9
HYDRADEPHAGA - -	Halipilidae to Gyrinidae - -	23	136	17	66	73·9	48·5
PHILHYDRIDA - -	Hydrophilidae - - - -	25	117	19	88	76·0	75·3
BRACHELYTRA - -	Staphylinidae - - - -	137	880	96	529	70·0	60·1
NECROPHAGA - -	Leptinidae to Heteroceridae -	194	711	154	166	79·3	62·6
LAMELICORNIA - -	Lucanidae and Scarabeidae - -	28	89	18	55	64·2	61·8
STERNOXI - - -	Buprestidae to Elateridae - -	26	83	18	41	69·2	49·4
MALACODERMATA - -	Dascillidae to Cissidae - -	61	170	40	95	65·5	55·8
LONGICORNIA - -	Prionidae to Lamidae - - -	30	58	22	30	73·3	51·7
PHYTOPHAGA - -	Bruchidae to Cassididae - -	48	267	42	174	87·5	65·1
HETEROMERA - -	Tenebrionidae to Meloidae - -	61	136	40	67	62·5	19·2
RHYNCHOPHORA - -	Anthribidae to Scolytidae - -	123	516	92	328	74·8	60·0
ABNORMAL COLEOPTERA	Stylopidae - - - -	3	16	2	7	66·6	43·7
	Total - - -	826	3571	603	2120	73·0	59·3

Several of the larger genera of Coleoptera are exceedingly well represented in the Oxford District, and of these the following may be specially noted :

<i>Bembidium</i>	is represented by 26 out of 53 British species.
<i>Homalota</i>	“ “ “ 95 “ 180 “ “
(<i>Atheta</i>)	
<i>Philonthus</i>	“ “ “ 41 “ 56 “ “
(including <i>Gabrinus</i>)	
<i>Lathrobium</i>	“ “ “ 13 “ 19 “ “
<i>Stenus</i>	“ “ “ 46 “ 65 “ “
<i>Anisotoma</i>	“ “ “ 16 “ 28 “ “
<i>Aphodius</i>	“ “ “ 28 “ 49 “ “
<i>Donacia</i>	“ “ “ 13 “ 19 “ “
<i>Longitarsus</i>	“ “ “ 28 “ 43 “ “
<i>Apion</i>	“ “ “ 56 “ 80 “ “
<i>Ceuthorrhynchus</i>	“ “ “ 38 “ 56 “ “
(with <i>Ceuthorrhynchidius</i>)	

On the other hand, out of the 24 species of *Bledius* now known as British, it is remarkable, considering the facility with which the members of this genus can be detected when present, that only three, *longulus* Er., *fracticornis* Payk., and *opacus* Block., have with certainty been found in the District up to the present time. Several other important genera are but poorly represented, and a few conspicuous and fairly common beetles have not yet been taken here.

In the space at our disposal it is possible to allude only to a limited number of the many interesting species of Coleoptera which have been observed up to the present time within the limits of the Oxford District. Commencing with the Carabidae or predaceous ground-beetles, *Calosoma inquisitor* L. has been taken freely in Bagley Wood, walking down the trunks of oaks in the early mornings of summer ; the usually scarce *Notiophilus rufipes* Curt. is not uncommon among dead leaves at Hen Wood, and *Dyschirius politus* Dej. has been taken commonly in the brick-pits on Shotover

Hill, where the pretty red-spotted *Panagaeus quadripustulatus* Sturm, which is, however, more plentiful at Tubney Wood, is sometimes to be met with. The chalk-loving *Licinus silphoides* F. has occurred rarely near Elsfield, and the banks of the rivers and other wet places produce, among many commoner species, *Chlaenius nigricornis* F., *Oödes helopioides* F., *Badister unipustulatus* Bon., *B. sodalis* Dufts., and *Pterostichus gracilis* Dej. more or less freely. The fine and scarce *Ophonus obscurus* F. has been taken not rarely in the old quarries at Enslow Bridge near Kirtlington, in company with the usually maritime *O. rupicola* Sturm and the explosive 'Bombardier,' *Brachinus crepitans* L.; *O. punctatulus* Dufts. has occurred rarely near Tubney, where *Harpalus discoideus* F., which until recently was one of the most highly prized members of its genus, is quite common under stones in sandy fields. The beautiful *Pterostichus dimidiatus* Ol., recorded by Hope as 'Taken at Oxford, 1819,' has not been observed in recent years, but its ally *P. lepidus* F. is sometimes quite common in the sand-pit in Tubney Wood, where the fine and uncommon *Amara patricia* Dufts. has been taken in some numbers with *A. consularis* Dufts.; *A. anthobia* Villa, not long since added to the British list, has occurred freely at Summer-town. The genus *Anchomenus*, so characteristic of wet places, is represented by no fewer than sixteen out of our twenty-two native species, *A. livens* Gyll., and *A. puellus* Dej., being the best; the beautiful *A. sexpunctatus* L. was also recorded from 'river-banks' by the late J. W. Shipp, but there is no locality in the District at all likely to produce this heath- and sphagnum-loving species. In flood-refuse, among a host of common *Bembidia*, etc., *Trechus micros* Hbst. is plentiful, *T. discus* F., and *T. secalis* Payk. being much scarcer; the little *Tachys bistriatus* Dufts. occurs freely in wet moss at Wytham Park; *Tachypus pallipes*

Dufts. has been taken by Mr. J. Collins near Cumnor, and *Dromius quadrisignatus* Dej. by the present writer under bark in Tubney Wood. The brilliant *Lebia chlorocephala* Hoffm. is found, sometimes in abundance, at Bullingdon Bog and elsewhere by cutting tufts of grass in winter, and its smaller and scarcer form *chrysocephala* Mots. has been obtained in the same way at Bagley Wood.

In the HYDRADEPHAGA, eleven out of the sixteen species of *Haliphys* now recognised as British, including most of the recently introduced forms, have been identified from the District; the nearly allied *Cnemidotus impressus* F., not often found inland, has been taken in running water at Gosford Bridges near Kidlington, where also *Brychius elevatus* Panz., a very pretty light-coloured form of the variable *Platambus maculatus* L., and the curious 'whirligig' *Orectochilus villosus* Müll., occur in profusion, and the rare smooth female form of *Dytiscus marginalis* L. (*dubius* Steph.) and *Gyrinus urinator* Ill. have once or twice been taken. The species of *Hydroporus*, though numerous, are mostly common, those worthy of special mention being *melanarius* Sturm, *discretus* Fairm., *marginatus* Dufts., and *ferrugineus* Steph., all of rare occurrence here. *Agabus biguttatus* Ol. was taken not rarely some years ago in running water at Weston-on-the-Green by Mr. J. Collins, who also found the very local *A. uliginosus* L. (whose headquarters is that classic locality for water-beetles, Askham Bog near York) in Cherwell flood-rubbish during the winter of 1911-12, and it has occurred on several occasions since under similar conditions. Of the *Philhydrida*, the var. *picicrus* Thoms. of the common *Hydrobius fuscipes* L. is much more plentiful than the type-form, and the beautiful green var. *aeneus* Sol. has been once taken in flood-refuse, which has also produced the northern *Helophorus arvernensis* Muls. rarely, the very scarce *Ochthebius aeneus* Steph. singly, and *O. rufi-*

marginatus Steph. rather commonly. The variable *Cercyon terminatus* Marsh. is plentiful in dry manure-heaps, and *C. (Cercyon) minutus* F. and the recently described *C. sternalis* Sharp are not rare in wet moss and flood-refuse.

The number of noteworthy species of the great division BRACHELYTRA that have been observed in the District is very large, and of these, special mention may be made of those very interesting forms which are associated with various ants, as well as those first indicated by Dr. N. H. Joy as having their true habitat in the subterranean nests of the mole. Among the former, *Homaeusa acuminata* Märk., *Thiasophila inquilina* Märk., *Microglossa gentilis* Märk. (also taken in débris of an owl's nest at Ferry Hinksey), *Notothecta confusa* Märk., several species of *Myrmedonia* and *Quedius puncticollis* Thoms., have been found, mostly in numbers, with the black ant *Acanthomyops (Lasius) fuliginosus* Latr. ; and the nests of the wood-ant, *Formica rufa* L. at Tubney, produce *Dinarda märkeli* Kies., *Quedius brevis* Er., and other choice species of beetles. In the moles' nests are found *Aleochara spadicea* Er., *Oxypoda metatarsalis* Thoms., *Homalota paradoxa* Rey, *Quedius othiniensis* Johan., *Q. longicornis* Kr., *Heterothops niger* Kr., *Oxytelus sauleyi* Pand., and the handsome *Medon castaneus* Grav., all of which, though in reality not uncommon, were either unknown as British species or of the greatest rarity previous to the discovery of their true habitat. *Aleochara crassiuscula* Sahlb. is not rare in manure-heaps at Summertown in late autumn, *A. brunneipennis* Kr. has occurred in fungi at Tubney, and the very rare *A. maculata* Bris. in tufts of grass and by sweeping in early spring in widely separated localities. The fine *Oxypoda spectabilis* Märk. has been taken sparingly in mouse-nests and by sweeping in autumn, and the very rare *O. nigrocincta* Muls. et Rey owes its place on our British

list to the capture of a single specimen by Mr. H. St. J. Donisthorpe in moss near Yarnton on 25th May, 1924. The three rare species of *Ilyobates*, *nigricollis* Payk., *propinquus* Aubé, and *forticornis* Lac. have been taken sparingly in flood-refuse, and six out of the seven British species of the rare and elegant genus *Calodera* occur more or less freely by cutting tufts of grass in wet places in early spring, with the handsome *Myrmedonia* (*Zyras*) *collaris* Payk. occasionally. Among the multitude of species of the great and unwieldy genus *Homalota* (*Atheta*), the most noteworthy are *longicollis* Rey, *crassicornis* Gyll., *occulta* Er., *deformis* Kr., *elegantula* Bris., *splendens* Kr., *exillima* Sharp, *hepatica* Er., *exarata* Sharp, *clancula* Er., *scapularis* Sahlb., *dilaticornis* Kr., *testaceipes* Heer and *orphana* Er. *Tachyusa scitula* Er. has been taken not rarely at Shotover by Mr. H. Britten, and most of the species of *Gyrophæna* are found in numbers in fungi; *G. pulchella* Heer is not uncommon in autumn at Cothill, and *G. lucidula* Er. occurs rarely in wet places at Yarnton and Wytham Park. *Oligota granaria* Er. has been taken freely among sweepings in the water-mill at Cothill, and the minute but conspicuous *O. apicata* Er. was once met with in plenty in fungoid growth on beech-bark at Wood Eaton. The scarce *Lamprinus saginatus* Grav. has been found at Tubney and elsewhere in company with the ant *Myrmica rubra* L.; *Tachinus elongatus* Gyll. has been caught on the wing in North Oxford, *Megacronus cingulatus* Mann. and *M. inclinans* Grav. have occurred rarely in grass-tufts in the woods, and Mr. W. Holland captured the rare *Euryporus picipes* Payk. on 3rd June, 1908, by sweeping near Yarnton. The little *Quedius microps* Gr. is sometimes not uncommon in wet rotten wood; *Q. ventralis* Ahr., *brevicornis* Thoms., and *scitus* Grav. have been taken also, but very rarely, and a few specimens of *Staphylinus latebricola* Grav. have occurred

in flood-refuse and on hawthorn-blossom. One of the most interesting captures is the rare and handsome *Ocypus cyaneus* Payk., which was first taken near Besselsleigh by Mr. J. Collins on 23rd July, 1916, and in several subsequent years it occurred sparingly in the Tubney Wood sand-pit in August. *O. fuscatus* Grav. has been taken freely in Cherwell flood-refuse; and of the genus *Philonthus*, *lucens* Er., also sometimes common in the same material, *corruscus* Grav. taken in carrion in Wytham Park by Mr. Collins, and *vernalis* Grav. found rather sparingly at Cothill and Tubney in moss and dead leaves, may be mentioned. *Xantholinus fulgidus* F. has recently occurred in manure-heaps at Wood Eaton, etc., with *Medon obscurellus* Er. in numbers, and the tiny *Trogophloeus subtilis* Er. singly; the first specimen of this very rare beetle noted in the District having been taken at Cowley by Mr. A. H. Hamm in the clutches of the predaceous fly *Hilara maura* F. *Xantholinus cribripennis* Fauv. is found sparingly in sandy places at Shotover and near Cothill, and *Lathrobium filiforme* Grav. is one of the commoner river-bank beetles; the rare *L. pallidum* Nord. is found in small numbers in Cherwell flood-refuse, and the still rarer *L. longipenne* Fairm. has been taken once or twice in sand-pits at Cumnor and Tubney Wood. From the latter locality is recorded the second British example (there are but three) of *Medon dilutus* Er., which was taken in November 1899 by a promising young Coleopterist too early lost to science, Mr. C. E. Collins of Reading. *Dianöus coerulescens* Gyll. abounds among wet moss at a mill-weir near Headington, and of the numerous species of *Stenus*, *lustrator* Er., *melanarius* Steph., *nitens* Steph., *solutus* Er., and *circularis* Grav., all more or less scarce, are the best; *Platystethus alutaceus* Thoms. and *Oxytelus fulvipes* Er. occur sparingly in wet places, and the rare *Acidota cruentata* Mann. has been

taken singly in early winter at Wytham Park and Shotover: *Deliphrum tectum* Payk., found rarely in rotten fungi, is perhaps here at its southernmost limit in Britain, and sweeping at Wood Eaton has produced *Homalium salicis* Gyll., a very scarce insect, and the curious and uncommon *Pseudopsis sulcata* Newm.; this last has also been found in dry fungi and haystack refuse.

The NECROPHAGA (or CLAVICORNIA) are also very well represented in genera and species, the genus *Anistoma* and its allies, so highly prized by collectors, being especially so when the rarity of many of its members is considered. The finest species, *A. cinnamomea* Panz., is in some years quite common by sweeping under the beech trees at Wytham Park in autumn, with its near ally *A. anglica* Rye on rare occasions; at the same time and place, as well as under the pines at Tubney, the rare and distinct *A. rugosa* Steph. may be taken sparingly. The latter fine locality has also produced *A. treipkei* Schm. commonly, *A. curta* Fairm. sparingly, and the very rare *A. lunicollis* Rye (once taken by Mr. Collins) and *A. brunnea* Sturm occasionally. *Agaricophagus cephalotes* Schm., another rarity, has been obtained quite freely at Wytham Park with *Hydnobius punctatissimus* Steph. and *H. strigosus* Schm., and the still rare *Triarthron märkeli* Schm. has occurred at Tubney and Hen Wood. The capture of *Necrophorus germanicus* L. early in the last century by the Rev. F. W. Hope has already been mentioned; his note thereon states that 'it has twice been taken at Lord Abingdon's woods at Witham (*sic*) on the bodies of dead game laid to ensnare Vermin.— It was taken in 1822 at the same place and sent to me, it was about the 6th of August.' *N. vestigator* Hers. and *N. interruptus* Steph. are not very rare in carrion, with the coast-loving *Necrodes littoralis* L. less frequently. The rare genus *Colon* is represented in the District by *C. viennense*

Hbst. and *C. serripes* Sahlb., which have been taken somewhat freely at Prattle Wood near Wood Eaton by evening sweeping; *C. dentipes* Sahlb. with its varieties *barnevillei* Kr. and *zebei* Kr. (probably distinct species) occur rarely at Wytham Park and Tubney, and *C. denticulatum* Kr., *appendiculatum* Kr. and *latum* Kr. have each been taken only once, the two latter by Mr. Collins. *Neuraphes rubicundus* Schaum, *Euconnus denticornis* Müll. and *E. hirticollis* Ill., all scarce species, have been met with at intervals, and the second British example of the very rare *E. mäklini* Mann. was taken near Headington by evening sweeping on 19th July, 1916, by the present writer, who also found the rare *Euthia formicetorum* Kr. in decayed oak boughs at Prattle Wood. It was his good fortune as well to discover the long-looked-for blind ants'-nest beetle *Claviger longicornis* Müll. during an excursion of the Ashmolean Natural History Society to Gibraltar Quarries, Oxon, on 31st May, 1906. Five examples were taken on that occasion in nests of the black ant *Lasius niger* L., and the insect has since been found there very sparingly, as well as in two other British localities. Its congener, *C. testaceus* Preyss., was first taken in England by Prof. Westwood in 1838, at Wychwood and Eynsham, and is widely distributed in the District, though scarce, in the nests of the yellow ant *Myrmica flava* De G. The rare *Pselaphus dresdensis* Hbst. has been obtained freely from wet moss in summer at Yarnton, where the still rarer *Euplectus decipiens* Raffray has been taken by Mr. Collins, as well as at Wytham; *E. aubeanus* Reitt., another fine and rare species of this interesting genus, has occurred rarely at Summertown by evening sweeping under hedges, where also *Biblopectus minutissimus* Aubé, previously known as British from flood-refuse of the Trent at Burton, has been only once taken on 4th June, 1906. An as yet undescribed

member of this genus (*ultimus*, Sharp MS.) occurs in profusion in flood-refuse at times. *Batrisus venustus* Reich. and *Trichonyx* (*Amauronyx*) *märkeli* Aubé have both fallen to the lot of Mr. Collins, who has taken the latter rarity in numbers in the Cumnor sand-pit ; and our finest Pselaphid, *T. sulcicollis* Reich., was once swept up at Wood Eaton by the writer.

The first specimen of one of our greatest rarities, *Ptinella britannica* Matth., was found running on the back of a slug, *Limax maximus*, at Weston-on-the-Green by the Rev. A. Matthews ; and the active little *Smicrus filicornis* Fairm., almost equally rare until quite recently, has been taken freely in old manure-heaps at Wood Eaton and elsewhere. *Sphaerius acaroides* Walzl is another interesting record from Weston-on-the-Green, but it has not been found there since the time of its discoverer, the Rev. A. Matthews. *Scymnus arcuatus* Rossi, a pretty and distinct little species, very rare until the discovery in 1915 of its habits by the Rev. Father Perry near Henley, was in that year beaten sparingly from old ivy on the ruins of Godstow Nunnery, but has not occurred since ; *Symbiotes latus* Redt. has been taken rather freely in an elm stump at Wood Eaton, and the handsome *Lycoperdina bovistae* F. is fairly common in ripe puff-balls under the Tubney fir-trees in late autumn. The exceedingly rare *Oxylaemus variolosus* Dufts. was shaken out of a rotten oak faggot by the writer on his first visit to Bagley Wood on 14th May, 1904 ; *Synchita juglandis* F., another rarity, was once taken on a decayed birch tree in Tubney Wood, and *Myrmecoxenus vaporariorum* Guér. has occurred in plenty by sifting haystack refuse at Wytham Park ; the same material at Water Eaton has produced *Aglenus brunneus* Gyll. and the minute *Holoparamecus caularum* Aubé in large numbers. *Hister marginatus* Er., not long since one of our rarest

beetles, occurs regularly but sparingly in moles' nests, also in rabbit-burrows with *H. purpurascens* Hbst. ; *Onthophilus globulosus* Ol., its usual companion in the first-named habitat, is here a rarity, having been found casually on one or two occasions in carrion, etc. The handsome green *Saprinus virescens* Payk. is frequently swept from the flowers and foliage of *Anthriscus sylvestris* and other Umbelliferous plants, and the once rare little Histerids, *Plegaderus dissectus* Er. and *Abraeus granulum* Er. occur in rotten wood, the latter having been found in plenty in the remains of the 'Tubney Elm,' after the downfall of that celebrated tree. *Micropeplus tesserula* Curt. was once swept up near Marston Ferry, and *Thalycra sericea* Sturm is one of the prizes to be obtained by evening sweeping at Wytham Park, where *Epuraea angustula* Er. has been once taken ; and *E. parvula* Sturm has been beaten freely from birch faggots at Cothill. The curious *Nemosoma elongatum* L., one of the most interesting 'finds' in the District, was met with by Mr. Collins in August 1913, in all its stages under bark of elm rails at Water Eaton in company with the Scolytid *Hylesinus vittatus* F. on which it is parasitic. Large numbers of this beetle were then taken, but it has not been seen since this occasion. The same energetic collector, in June 1924, found *Laemophloeus bimaculatus* Payk. in plenty under the bark of a dead oak near Summer-town ; *L. ater* Ol. is not rare in dead broom at Cumnor Hurst, and *Pediacus dermestoides* F. is sometimes quite common under bark at Wytham Park. Of the genus *Cryptophagus*, *ruficornis* Steph., *populi* Payk., *umbratus* Er., and *fumatus* Gyll. may be mentioned, the latter rare species having been found on more than one occasion in the University Museum. *Atomaria fimetarii* Hbst., the largest of its genus, is sometimes common at Wolvercote, and *A. zetterstedti* Zett., a very distinct species in appearance and

habits, was first taken in Britain by Mr. Collins at Weston-on-the-Green in April 1914 by beating old sallow-bloom, and it has been obtained freely in the same way near Yarnton. *Mycetophagus populi* F., the rarest save one of its genus, has been found near Water Eaton; *Byrrhus dorsalis* F. is not scarce in the Tubney sand-pit, and the little *Limnichus pygmaeus* Sturm. occurs freely in wet places in the Shotover brick-pits; while all the British members of the aquatic genus *Elmis*, with the exception of the very rare *E. sodalis* Er., are to be found more or less commonly adhering to stones in running water.

The Stag-beetle, *Lucanus cervus* L., is decidedly rare at Oxford, and has only been observed on one or two occasions in recent years; the capture by the Rev. F. W. Hope, more than a century ago, of its small relative *Platycerus caraboides* L., 'taken in July at Oxford not far from Witham (*sic*), cut out of a dry and almost sapless oak,' has already been mentioned, and he also notes a specimen at about the same time 'flying in the High St. at Oxford.' *Copris lunaris* L. as yet has occurred but once, near Tubney; *Aphodius constans* Duft., once regarded as rare, at least in the south, is one of the commonest members of its genus in spring; *A. porcus* F. is found but rarely, and *A. lividus* Ol. has been taken on the wing near Kirtlington. The little *Plagiogonus arenarius* Ol. is fairly frequent in rabbit-burrows, and *Heptaulacus villosus* Gyll., so rare in Britain before it was taken in profusion in 1889 at Cobham Park, Kent, by the late Dr. Sharp and the writer, has occurred rarely at Tubney and more freely near Elsfeld. *Trox sabulosus* L. is sometimes common under dry carrion at Tubney, and the beautiful 'Rose-chaffer,' *Cetonia aurata* L., is a familiar object in Oxford gardens in early summer. Of our very few British *Buprestidae*, the curious and scarce little *Aphanisticus pusillus* Ol. is found rarely by sweeping

at Wytham Park and Tubney; at both these localities the usually searee *Trachys pumila* Ill. is sometimes quite common on ground-ivy (*Nepeta glechoma*); its larger congener, *T. minuta* L., may be beaten freely from sallows at Bagley and Waterperry Woods, and the much rarer *T. troglodytes* Gyll. has been taken very sparingly at Cothill and Tubney, as well as at the last-named wood, by sweeping in damp situations. *Throscus obtusus* Curt., which is not uncommon in flood-refuse and tufts of grass in early spring, was first taken in Britain many years ago by Prof. Westwood at Eynsham, and the type-specimen stands in the University Museum collection of Coleoptera; *T. carinifrons* Bonv. has been beaten freely from spruce fir at Tubney Wood, and the fine *Melasis buprestoides* L. has been found breeding in solid hornbeam at Bagley Wood, and in profusion at Wytham Park in a dead standing beech. The Elateridae present few if any species of notable interest, the best captures of recent date being *Elaterel ongatulus* F. in decayed pine trunks at Tubney Wood, *Corymbites pectinicornis* L., taken at Bagley Wood by Mr. J. W. Shipp, *C. bipustulatus* L., rarely at Bagley, Elsfield and Wood Eaton, and *C. metallicus* Payk. in plenty by sweeping in early summer under willows at Marston Ferry.

The MALACODERMATA include the rare *Prionocyphon serricornis* Müll., which has occurred at Wytham Park on several occasions, as well as singly at Tubney and near Kirtlington, Oxon. *Eubria palustris* Germ., first made known as a British beetle from specimens taken at Weston-on-the-Green by the Rev. A. Matthews, may be obtained in plenty at Bullingdon Bog and Cothill by sweeping in very wet places on hot days in early summer. *Silis ruficollis* F. occurs sparingly on reeds at Weston-on-the-Green, and the local *Rhagonycha unicolor* Curt. has been taken rarely at Wytham Park; *Anthocomus rufus* Hbst.,

first observed by Mr. Collins in August 1911, is common at Cothill in late summer on *Umbelliferae*. The two scarce species of *Haplocnemus*, *impressus* Marsh. and *nigricornis* F., have been taken on hawthorn-blossom and under bark; *Phloeophilus edwardsi* Steph. is common by sweeping in autumn at Wytham Park, and the conspicuous *Tillus elongatus* L. and *Thanasimus formicarius* L. occur but rarely. *Ptinus subpilosus* Müll. has been found singly at intervals in a nest of *Acanthomyops fuliginosa* Latr. near Tubney; *P. tectus* Boield., not very long added to the list of British beetles but now become quite common, is often picked up in the Museum, and the pretty *P. sexpunctatus* Panz. has been taken freely by Mr. Collins in his garden at Summertown, and also bred in large numbers by Mr. A. H. Hamm from the cells of the common bee *Osmia rufa* L. The once rare *Sphindus dubius* Gyll. is common in small snuff-like fungi on rotten beech wood at Wytham Park.

The largest British member of the LONGICORNIA, *Prionus coriarius* L., has been taken on several occasions about dead oak and birch trees at Tubney Wood. *Aromia moschata* L., the 'Musk-beetle,' as may be expected in a district where willows are so much in evidence, is common on the river-banks, and two Longicorn beetles of recent introduction to our list, *Criocephalus fesus* Müll. and *Tetropium fuscum* F., have been taken rarely, though the ravages of the larva of the latter species are very evident in some larch trees in Tubney Wood. Stumps of fir trees cut down here and at Bagley Wood during the late war are full of the very characteristic burrows of *Asemum striatum* L., which has become so plentiful in the South of England in recent years, but here again the perfect beetle has been seldom met with. The larvae of the pretty blue *Callidium violaceum* L. often do serious damage to the rustic pine fences so much in favour in the outskirts of Oxford;

Clytus mysticus L. is not rare on hawthorn-blossom, on which the uncommon *Molorchus minor* L. has been taken sparingly at Wytham Park, as well as near Bladon, Oxon. *Leptura livida* F., a species partial to the coast, is common at Tubney, and *Grammoptera analis* Panz., which has its headquarters in the New Forest, has been taken freely at Waterperry Wood on the blossoms of *Pyrus torminalis* and hawthorn. The northern *Acanthocinus aedilis* L. has been picked up on two or three occasions in the City, probably brought in timber; *Agapanthia lineatocollis* Don. has been captured in numbers on thistles and *Eupatorium* at Headington Wick Copse, *Phytocia cylindrica* L. is to be taken sparingly on flowers at Cothill in early summer, and *Oberea oculata* L., now practically confined to the Cambridgeshire fens, was recorded as 'Taken at Oxford in 1819' by the Rev. F. W. Hope.

In the PHYTOPHAGA, the rare *Bruchus canus* Germ. has been taken by sweeping sainfoin near Abingdon and Kirtlington, in each case only singly. *Orsodacna lineola* Panz. is rare on hawthorn-blossom near Marston, and the beautiful genus *Donacia* is well represented in the District by thirteen out of our nineteen British species, several of these being excessively numerous on the river-side herbage in their season. Of these the best are the active *D. crassipes* F., not rare on water-lilies in the Cherwell; *D. dentata* Hopp., sometimes abundant on *Sagittaria*; and *D. sparganii* Ahr., plentiful on *Glyceria fluitans* on the Canal beyond Wolvercote; *D. impressa* Payk., usually a scarce species, has occurred rather freely on *Carex* at King's Weir, where *D. clavipes* F. and *D. cinerea* Herbst. have been taken but rarely. As long ago as 1872, the late Dr. W. Hatchett Jackson, when fishing for aquatic animals among the weeds in the Isis at Binsey, had the good fortune to find a pair of the curious *Haemonia appendiculata* Panz., which at that

time and for long afterwards was one of the rarest of British beetles. After a long and fruitless search in every likely locality, the present writer and Mr. Collins succeeded in finding the *Haemonia* 'at home' on *Potamogeton pectinatus* in an affluent of the Cherwell near Kidlington. A considerable number of specimens were subsequently taken by ourselves and other collectors, and Mr. Collins was enabled to work out the life-history of the beetle (cf. *Entom. Monthly Magazine*, 1911, pp. 248-251). Mention may be made here of *Gynandrophthalma affinis* Hell., whose sole British locality as yet is Wychwood Forest, where it was discovered by Mr. W. Holland in June 1899, and taken by him plentifully in 1903. *Cryptocephalus bilineatus* L. is apparently confined to a short length of railway-bank near Yarnton, where it is common; the much rarer *C. frontalis* Marsh. has been taken at Marston, Yarnton, Cothill, and Wood Eaton, but almost always singly. The fine violet-blue *Chrysomela goettingensis* L. is widely distributed in the District, and has been found plentifully by Mr. Holland at Tubney; *C. orichalcia* Müll., with its variety *hobsoni* Steph., is not rare on *Anthriscus*, and *C. brunsvicensis* Grav. (*didymata* Scriba of our lists) is locally abundant on *Hypericum quadrangulum*. *Plagiodera versicolora* Laich., a local and usually scarce insect, was so abundant at South Hinksey in the summer of 1904 as almost to defoliate the willows on which it occurred, but has since been much less plentiful. Of the numerous members of the genus *Longitarsus*, *holsaticus* L. on *Pedicularis* at Bullingdon Bog and Cothill, *agilis* Rye, common on *Scrophularia* in autumn at Cothill, *suturalis* Mars. very rarely, and *nasturtii* F. commonly by general sweeping, *curtus* All., not rare at Wytham Park on *Echium* and *Myosotis*, *lycopi* Foudr., abundant on *Mentha* in the same locality, and *flavicornis* Steph., locally common in autumn on *Convolvulus sepium*, deserve mention;

Phyllotreta punctulata Marsh. and the recently introduced *P. diademata* Foudr. are apparently not rare, and the little pallid *Aphthona nigriceps* Redt., a very local species, occurs in great profusion at Enslow Bridge, Oxon, on *Geranium pratense*. The beautiful *Crepidodera* (*Chalcoides*) *nitidula* L. has been beaten in numbers from aspens in Bagley Wood, and *Epitrix atropae* Foudr. abounds at Wytham Park on *Atropa belladonna*, and at the same prolific locality *Psylliodes hyoscyami* L. is plentiful on *Hyoscyamus niger*. *P. luteola* Müll. was exceedingly rare in Britain before a station was found in the autumn of 1913 outside the wall of Kirtlington Park, where it is still to be taken fairly commonly at times, though its food-plant has not yet been recognised. Among the Cassididae or 'tortoise-beetles,' *Cassida murraea* L. was found in plenty on one occasion in all its stages on *Inula dysenterica* growing by the Chilswell footpath; *C. sanguinolenta* F. is not very scarce on *Achillea millefolium*, and the rare little *C. hemisphaerica* Hbst. has been taken at Tubney Wood on several occasions on *Lychnis vespertina*, as well as in the sand-pit.

In the HETEROMERA, besides *Crypticus quisquilius* L. and *Oteniopus sulphureus* L., already alluded to, another beetle usually of maritime habitat, *Nacerdes melanura* L., has been found several times in the City. *Tetratoma fungorum* F. is often plentiful in fungi in autumn; *T. desmaresti* Latr., *Anisoxya fuscata* Ill., and *Abdera quadrifasciata* Curt., three species of considerable rarity, have been taken at Wytham Park, the last-mentioned occurring in numbers on a dead standing beech for several years in succession; *Abdera bifasciata* Marsh., *Hallomenus humeralis* Panz., and *Conopalpus testaceus* Ol. are also found rarely on old timber. The rare *Salpingus mutilatus* Beck. has been twice swept up at Wytham Park, where *Mordella fasciata* F. is sometimes common on umbels in July; it has also occurred

freely at Radley, which is probably the locality where *Mycterus curculionoides* F., a doubtful native of Britain, was taken by Mr. M. Gunning about the year 1882, as recorded by the late Canon Fowler in the *Entomologist's Monthly Magazine*, 1890, p. 85. The curious *Notoxus monoceros* L. is as common in sandy places at Tubney and elsewhere as it is in its more usual habitat at the seaside; *Xylophilus populneus* Panz. and *X. oculatus* Gyll. have occurred rarely by sweeping, and *Metoecus paradoxus* L. has been taken on flowers, and is probably common if looked for in wasps' nests in late summer. One of the most interesting of the local beetles is the curious *Sitaris muralis* Först., which for several years was to be taken in fair numbers in August and September on old stone walls inhabited by the bee *Podalirius pilipes* F., on which the beetle is parasitic in its early stages. Cowley (where Mr. A. H. Hamm first took it in 1906), Iffley, Littlemore and Wolvercote, are among its Oxfordshire stations, but there is no record of its occurrence in the Berkshire section of the District. The intensely hot and dry summer of 1911 greatly reduced its numbers, and the insect has scarcely been seen since that year.

The RHYNCHOPHORA, or 'weevils,' are represented by a large number of interesting and often rare forms. *Rhinomacer attellaboides* F., a pine-feeding beetle which of late years has greatly extended its range southwards, is taken rarely at Tubney. The beautiful *Byctiscus betuleti* F. and *B. populi* L., long ago recorded by Hope from Bagley Wood, has been sought for there since in vain, but the recently described *Rhynchites harwoodi* Joy is to be found on willows at Cothill, and the rare little *R. pauxillus* Germ. at Waterperry Woods. The Oxford District is apparently the headquarters of four of our rarest and most interesting species of *Apion*, *sanguineum* De G., *laevigatum* Kirby

(*brunnipes* Boh.), *annulipes* Wenck., and *astragali* Payk. The first two are apparently restricted to a relatively small area near Tubney, where in some seasons they have been taken freely ; *A. annulipes* has been found singly in several widely separated localities, and more plentifully, in a very restricted area near Bletchingdon Station ; and *A. astragali*, first taken near Chawley, Berks, by Mr. W. Holland in 1905, is widely distributed and often common where its food-plant, the local *Astragalus glycyphyllos*, grows. Of the other members of this large genus, so well represented in the District, mention may be made of *A. cracca* L., *cruentatum* Walt. (*fide* Dr. Sharp), *desideratum* Sharp, *pallipes* Kirby, *dissimile* Germ. (common at Tubney on *Trifolium arvense*), *stolidum* Germ., *vicinum* Kirby, *atomarium* Kirby, *filirostre* Kirby, *waltoni* Steph., *simile* Kirby, and *affine* Kirby, most of which may be taken commonly on their respective food-plants. One of the very few English specimens of *Otiorrhynchus porcatus* F. is recorded by Mr. Collins (*Ent. Mo. Mag.* 1918, p. 209) as having been taken near Summertown on 28th June, 1918. *Exomias* (*Barypithes*) *pellucidus* Boh. is locally common at Hen Wood, and *Tanymecus palliatus* F. abounds on *Centaurea Scabiosa* at Pixey Mead near Wolvercote ; the large *Cleonus sulcirostris* L., partial to the seaside, is found at the roots of thistles at Shotover Hill, Tubney, and Boar's Hill, the specimens from the last locality partaking strongly of the red tinge of the ferruginous sand on which they occur. *Lixus paraplecticus* L. (with *L. algirus* L., doubtless in error) was recorded a century ago by Hope as being plentiful on the banks of the Isis at Binsey ('near Bossom's'), but no one appears to have taken it since that time. The red-necked var. *collaris* Rye of the common *Liosoma ovatum* Clairv. is sometimes taken in grass-tufts in winter, and the much rarer *L. oblongulum* Boh. has occurred singly at

Wytham Park and Stow Wood; *Pissodes notatus* F., a northern species whose range southwards has greatly extended of late years, has been observed at Bagley Wood by Mr. F. W. Champion.

Grypidius equiseti F. and *Erirrhinus bimaculatus* F. are not uncommon in wet places, as at Pixey Mead, etc.; the curious long-legged male of *Dorytomus vorax* F. is common under poplar bark in winter, and the rare *Dorytomus tremulae* Payk., accompanied by *D. costirostris* Gyll. in numbers, is to be beaten in summer from *Populus canescens* at Cothill. One of the most interesting 'finds' is the pretty little *Acalyptus rufipennis* Gyll., which for many years was practically lost to the British beetle-fauna; it was rediscovered at the Peat-pits near Weston-on-the-Green in March 1913, and has since been taken in abundance there by beating the sallow-bloom in April. *Miarus graminis* Gyll. was once found in abundance near Stonesfield, Oxon, in flowers of *Campanula glomerata* as usual; *M. plantarum* Germ. is one of the commoner weevils in early autumn, and *Gymnetron melanarius* Germ. and *G. rostellum* Hbst. occur sparingly in sandy fields near Tubney, both being apparently attached to *Veronica officinalis*. On the yellow Toadflax (*Linaria vulgaris*) in the same places, *G. linariae* Panz. has been taken in large numbers, accompanied more sparingly by the rare *G. collinus* Gyll. *Coeliodes geranii* Payk. is common on *Geranium pratense* at Enslow Bridge, Oxon, and the coast-loving *C. exiguus* Ol. is locally plentiful on *G. pyrenaicum* near Cothill. The genus *Ceuthorrhynchus* (with its satellite genus *Ceuthorrhynchidius*) presents in the District, like *Apion*, a large number of noteworthy forms. The little *C. setosus* Boh. is common in early spring at Tubney on the inconspicuous Crucifer *Sisymbrium Thalianum*, and at the same time and place *C. pilosellus* Gyll., not long ago one of our greatest British

rarities, may often be found 'trapped' in rabbit-burrows, but so far all efforts to trace this species to its food-plant have been unavailing. *C. nasturtii* Germ. is common on watercress at Cothill, and has also been taken near Stanton St. John, Oxon; the large *C. geographicus* Goeze sometimes abounds on *Echium vulgare* at Tubney and Headington Wick Copse, and *C. viduatus* Gyll. has been taken rather freely near Yarnton on *Stachys palustris*. *C. rapae* Gyll., another fine and scarce species, is apparently confined to a very small area at Godstow, where it has occurred sparingly on *Sisymbrium officinale*; *C. resedae* Marsh. is sometimes plentiful on *Reseda luteola* near Elsfield, *C. urticae* Boh. has been once taken at Cothill, *C. euphorbiae* Bris. is fairly frequent on *Nepeta glechoma* at Tubney, Wytham Park and elsewhere, and the very pretty *C. triangulum* Boh., first observed on Foxcombe Hill in 1916, has occurred more freely on Shotover Hill on *Achillea Millefolium*. *Ceuthorrhynchidius terminatus* Hbst. is widely distributed, but always scarce, on the wild parsnip; the large *C. horridus* F. is often found on *Carduus nutans*; *C. quercicola* Payk. has occurred once or twice, and of the very rare *C. mixtus* Muls. some half-dozen specimens have been taken by casual sweeping in widely-separated localities in both counties, the first at Tubney on 16th May, 1910. *Rhytidosomes globulus* Herbst, a curious and decidedly scarce little weevil, was taken at Cothill in 1908, and has since been found in varying numbers every year in the same exceedingly limited spot, on saplings of *Populus canescens*. The subaquatic weevils *Eubrychius velatus* Beck. and *Litodactylus leucogaster* Marsh. are met with sparingly in and about the backwaters at Marston Ferry and elsewhere; *Phytobius comari* Hbst. is locally not rare on *Lythrum Salicaria*, and the usually rare *P. quadrinodosus* Gyll. (*denticollis* Gyll.) occasionally appears in the sweeping-net

at Wytham Park and Cothill. The chalk-loving *Baris picicornis* Marsh. has occurred on two occasions recently near Cothill on *Reseda lutea*, and its ally *B. lepidii* Germ. is not scarce in flood-refuse in spring, but has not yet been traced to its food-plant. *Cossonus ferrugineus* Clairv., a very local 'wood-feeder,' is sometimes so abundant in willows, as well as in elms and Lombardy poplars, as to cause very appreciable damage to these trees.

The SCOLYTIDÆ include, in addition to the well-named and only too abundant *Scolytus destructor* Ol. of the City elms, the less common *S. pruni* Ratz. and *S. rugulosus* Ratz. in apple and plum trees, and *S. intricatus* Ratz. in oak boughs in the larger woods. *Hylastes cunicularius* Er. is to be taken in felled spruce trees in Bagley Wood, and the little *H. attenuatus* Er., quite recently added to the British fauna, has been taken singly on several occasions by sweeping. *Hylastinus obscurus* Marsh. is common in broom-stumps at Cumnor Hurst; *Hylesinus crenatus* F. is at times very injurious to ash trees, under which *H. oleiperda* F. may frequently be taken by sweeping; and *H. vittatus* F. occurs abundantly under bark of elm rails, etc. *Cryphalus binodulus* Ratz. has been taken, but as yet rarely, among poplars at Cothill; *C. abietis* Ratz. has occurred by sweeping under pines at Weston-on-the-Green, whence the very rare *C. piceae* Ratz. was recorded long ago by the Rev. A. Matthews. *Trypodendron domesticum* L. has been found sparingly, and *Xyleborus saxeseni* Ratz. more plentifully, at Wytham Park under beech and ash bark, and the dead stems of *Clematis vitalba* at Enslow Bridge yield the little *Xylocleptes bispinus* Dufts. in profusion.

The ABNORMAL COLEOPTERA (STREPSIPTERA), now regarded by the majority of Entomologists as forming a distinct Order of Insects, have been the subject of special investigation by the late Geoffrey Smith, M.A., F.L.S., and

Mr. A. H. Hamm, and the results of their combined work are embodied in a highly valuable contribution to biological science.¹ Another very important addition to our knowledge of these insects, possibly in their structure as well as in their life-history the most extraordinary of the entire class, has been made by Dr. R. C. L. Perkins, F.R.S. (*Entom. Monthly Magazine*, 1918, pp. 67-78, Plate I.), in which the number of species of *Stylopidae* recognised as British has been increased from four or five to sixteen. In the course of many years of close and unremitting observation of their Hymenopterous hosts, Mr. Hamm has detected no fewer than seven species in the Oxford District, and certain of these once extremely rare insects are now known to be quite abundant, even within the precincts of the University Museum. These are as follows: *Stylops melittae* Kirby (host *Andrena nigroaenea* Kirby); *S. wilkellae* Perkins (host *A. wilkella* Kirby); *S. hammella* Perkins (host *A. chrysosceles* Kirby); *S. spencii* Pickering (host *A. tibialis* Kirby); *S. aterrima* Newport (host *A. trimmerana* Kirby); *S. dalii* Curtis (host *A. labialis* Kirby); *S. spretae* Perkins (hosts *A. spreta* Pércz and ? *A. minutula* Kirby); and *Halictoxenus spencii* Nassanov (host *Halictus nitidiusculus* Kirby). The exceedingly active male of *S. melittae* may often be seen in late May, flying in hot sunshine about noon in the University Parks.

¹ Smith, Geoffrey, M.A., and Hamm, A. H., 'Studies in the Experimental Analysis of Sex. Part II.—On *Stylops* and *Stylopisation*.' *Quart. Journ. Microsc. Science*, vol. 60, pp. 435-461, plates 32-35.

RHOPALOCERA (BUTTERFLIES)

BY JAMES J. WALKER, R.N.

SIXTY-EIGHT species of Butterflies are now recognised as occurring in the British Islands, and of these we have definite records of forty-four as having been observed in recent years within ten miles of Carfax, the centre of the City of Oxford. The tract of country within this limit is about equally divided by the Isis between the counties of Oxford and Berks, and attains its greatest elevation (562 feet) at Shotover Hill, about three miles east of the City. It extends nearly to the beautiful and productive chalk ranges of the Chilterns and the Berkshire Downs, but does not include any portion of either; though one or two of the characteristic chalk-hill butterflies, such as *Agriades corydon* Poda, and perhaps *Zizera minima* Fuesl., have wandered from thence and have established themselves in outlying stations in the district. With one or two exceptions, the Oxford butterflies appear to hold their own very well from year to year, despite the fact that much of the old woodland, especially at the celebrated Bagley Wood, has been drastically thinned out, and in great part replanted with uninteresting and unproductive Coniferous trees.

Pieris brassicae L. and *P. rapae* L. are as plentiful here as elsewhere, but vary greatly in numbers from year to year, especially the former. Their abundance or otherwise is no doubt largely affected by the vigorous crusade carried

on against them by school-children, 'head-money' for no fewer than 6000 'white' butterflies having been paid to one parish school during the summer of 1918. In the previous autumn the larvae of *P. brassicae* were so abundant as to destroy practically all the cabbages in the district, but were infested to such an extent with the Hymenopterous parasite *Apanteles glomeratus* that it is doubtful whether one per cent. of the entire number were able to reach the pupa state. *P. napi* L. is the commonest 'white' butterfly of the flowery water-meadows and river-sides, and as usual it exhibits a great range of variation in the development of its markings. *Euchloë cardamines* L. is also abundant in most years, and is a conspicuous and very beautiful feature of our grassy lanes and wood openings in May and June, specimens in good condition being sometimes seen quite late in July. *Colias hyale* L. and *C. croceus* Fourc. (*edusa* F.) are very uncertain in their appearance, and are never as numerous as on the South Coast; indeed, the former species has hardly been observed here at all since 1901 and 1902, in which years it was taken rather freely by Mr. A. H. Hamm in lucerne-fields near Cowley, Oxon. A few specimens of *C. croceus* are seen in nearly every summer, and in some years, notably in 1922, it appears in considerable numbers. *Gonepteryx rhamni* L. is one of our commoner butterflies, and specimens newly awakened from their winter sleep may often be seen in the main thoroughfares of Oxford on bright days in February and March; while its larva may be found readily enough on the buckthorn bushes at the proper season.

Apatura iris L. and *Limenitis sibylla* L. have been taken at intervals in Bagley Wood, and the former has even been seen flying along the road-side at Shotover Hill; but the headquarters of both these fine butterflies are the large woods north-east of Forest Hill, Oxon, where in most

years they are by no means rare, and in 1919 the larva of *A. iris* was beaten in some numbers from sallow bushes. Until quite recently *Polygonia c-album* L. was regarded as one of the rarest of the Oxford butterflies, as previous to 1921 it was met with at long intervals and nearly always by single specimens. Late in August of that year, it suddenly appeared in unexpected profusion at Tubney and elsewhere, being in fact the commonest *Vanessid* then on the wing; and even in the City gardens it was often to be seen on the asters and other autumnal flowers until the end of October. In each succeeding season, *P. c-album* has kept up its numbers fairly well, though it has never been as abundant as in its 'annus mirabilis,' 1921. *Eugonia polychloros* L. has been found in the immediate neighbourhood of Oxford in both the larval and perfect states, but is here a decided rarity; *Aglais urticae* L., though usually plentiful, has in some recent seasons been notably scarce, while *Vanessa io* L. is generally abundant. Of *V. antiopa* L. there are very few definite records from Oxford, and none of recent date; in the University Museum collection there is a very fine specimen taken by the late Rev. J. W. B. Bell in August 1900 on a sugared post at Pyrton, near Watlington, Berks, just outside our limits. *Pyrameis cardui* L. and *P. atalanta* L. are as irregular here as elsewhere in their appearance, the latter being the more 'dependable,' but both species are very plentiful in some seasons, and equally rare in others. *Dryas paphia* L. and *Argynnis adippe* L. are usually common in Bagley and Tubney Woods, as well as in those beyond Forest Hill, *A. aglaia* being less frequently met with, though at times by no means scarce. *Brenthis euphrosyne* L. usually abounds in all the woods in May, and *B. selene*, which appears somewhat later, is more local, but occurs freely in the damper parts of Tubney Wood; in the very hot summer

of 1911 a partial second brood of small specimens appeared in August. *Melitaea aurinia* Rott., though always very local, and varying greatly in abundance from year to year, is found in several widely separated stations round Oxford, having even occurred at Bullingdon Bog, almost in the outskirts of the City ; it is perhaps most plentiful at Cothill, Berks, and some of the forms that are met with there are very handsome.

Melanargia galatea L. is distributed over a considerable area of level country between Abingdon and Tubney, where it is found abundantly in sandy and marshy fields, grassy lanes, and even along the road-sides ; it is also found plentifully in several localities to the north of Oxford. On the other hand, *Pararge aegeria* L. is singularly scarce, and is only to be found with certainty in one of the northern woods, though it abounds on the Chilterns only a few miles distant. *P. megaera* L. is also scarce in some years, though abundant in others, and in hot summers, as in 1921, developing a strong third brood in September. *Epinephele ianira* L. in meadows, and *E. tithonus* L. in grassy lanes and on road-sides, are among the commonest butterflies of the district, and *Aphantopus hyperanthus* L. is usually very plentiful at bramble-blossoms in woody places, the var. *arete* occurring rarely, and a curious pale fuscous form has been taken at Cothill. *Coenonympha pamphilus* L. is, as usual, very common in dry open places, but no noteworthy variations of this species have been met with hereabouts.

Zephyrus quercus L. is in most seasons common in the woods where oak is the prevalent tree ; its congener *Z. betulae* L. is much more local and scarce, and is usually obtained in the larval stage by beating small sloe bushes in early summer. It is most frequent in the extensive tracts of woodland lying some miles eastward of Oxford, where in June 1918 an enthusiastic young collector

unexpectedly met with *Strymon pruni* L. not uncommonly. This interesting butterfly and its larva have in each succeeding year been taken in varying numbers, in a somewhat restricted area. *S. w-album* Kn. is in some seasons fairly common about elms and at privet and bramble-blossom at Radley, Besselsleigh and Tubney, and *Callophrys rubi* L. is plentiful; the larva may be swept in numbers from the flowers of *Genista tinctoria* where this plant grows freely. *Rumicia phlaeas* L. is found everywhere, and in some hot summers, as was notably the case in 1911 and 1921, it occurs in great numbers and presents a very interesting range of variation in successive broods. The silvery-white aberration *alba* Tutt was taken by Mr. W. Holland at Hen Wood, Berks, in August 1903; the ab. *radiata* Tutt, in which the coppery band on the hind-wings is replaced by one or more fine longitudinal streaks, has occurred more than once at Tubney, and the rare ab. *obsoleta* Tutt, in which the band is altogether absent, has been taken by Mr. A. H. Hamm at Bullingdon Bog. *Aricia astrarche* Bgstr. and *Lycaena icarus* Rott. are plentiful in grassy places, and *Agriades corydon* Poda, which up to 1916 was known from the District only by one or two casual specimens, was in that year found commonly on a limestone down near Headington, Oxon, and occurred there freely for several seasons before the locality was destroyed by close grazing. *Cyaniris argiolus* L. frequents the Oxford gardens and the Parks, as well as the more rural lanes, and has of recent years become very plentiful, especially in the spring brood, which is sometimes fully out by the end of April. *Zizera minima* Fuesl. has been recorded from the District by the late Mr. F. W. Lambert, but it is evidently rare or very local, and has not been since observed.

One of the most interesting of our smaller woodland butterflies is the lively little *Nemeobius lucina* L., which is

usually plentiful in May and early June at Bagley, Tubney and Wytham Woods in situations where primroses and cowslips grow freely. Of the *Hesperidae*, *Hesperia malvae* L. and *Thanaos tages* L. are both common, especially in the open parts of Wytham Park; *Adopaea thaumas* Hufn. and *Augiades sylvanus* Esp. being equally plentiful and more widely distributed.

Three other butterflies may have had a claim to a place on the Oxford list in past years. *Leucophasia sinapis* L. is said to have been long ago not rare in Bagley Wood, which is also given as a locality for *Melitaea athalia* Rott. in the Rev. F. O. Morris's *British Butterflies*; but the usual food-plant of the latter insect is decidedly uncommon there, though plentiful enough in the north-eastern woods, which look much more suitable for this local butterfly. *Carterocephalus palaemon* Pall. certainly occurred formerly at Wychwood Forest, Enstone, Bruern Wood and other localities in Oxfordshire, and it probably still lingers in some of these stations; but the statement that it was formerly taken in Bagley Wood, though not improbable, still lacks confirmation.

A statement made to the writer by a former Vicar of Beckley, Oxon, that a local tradition still exists of the occurrence long ago of the Large Copper, *Chrysophanus dispar* Haw. on Otmoor, is here given for what it is worth. This tradition, however, may have some foundation in fact, as Otmoor, now a monotonous expanse of level meadow-land, was a large tract of real wild fen country, probably quite suited to the existence of the butterfly, before the operations for its drainage and reclamation were commenced about the year 1820. The food-plant of *C. dispar*, the Great Water-dock, *Rumex Hydrolapathum*, is still plentiful by the sides of the drains and cuttings on Otmoor.

The American *Danaida plexippus* L., pre-eminently a butterfly of wandering propensities, appears to have visited Oxford in recent years on two occasions. The Rev. W. Mansell Merry informs me that in 1908 a specimen was brought to him by his gardener, Mr. Tann, who found it in a greenhouse in North Oxford and knocked it down with his cap, damaging it too much to be worth keeping. Two years later a fine example was taken, also in a garden in North Oxford, by a girl who passed it on to a Lepidopterist, Mr. Bryce M'Master. It remained *perdu* in his collection until the present year, being supposed to have been accidentally introduced in one of its early stages, when its possessor, on learning of its great interest, generously gave it to the writer. From its well-known life-history, it is most unlikely that the butterfly can have reached Britain otherwise than as a migrant in the imago state across the Atlantic Ocean.¹

[Since the above was written, Dr. F. A. Dixey has kindly called my attention to a statement by the Rev. J. G. Wood in his well-known book *Insects at Home*, p. 387 (1872): "I once saw a specimen (of *Papilio Machaon* L., the Swallow-tail Butterfly) in a field by the Cherwell near Oxford, and chased it for some time, but unsuccessfully. Whether or not this was an introduced specimen, I have no means of ascertaining."]

¹ Cf. *Entomologist's Monthly Magazine*, vol. L., pp. 181-193, 224-237 (1914).

MACRO-LEPIDOPTERA

BY JAMES J. WALKER, R.N.

THE larger Sphingidae are well represented in the neighbourhood of Oxford; *Dilina tiliae* L., *Amorpha populi* L. and *Smerinthus ocellatus* L. are common in the larval and perfect states, *Acherontia atropos* L. and *Sphinx convolvuli* L., though not rare in certain years, being much more irregular in their appearance. The beautiful larva of *S. ligustri* L. is a familiar object on privet hedges in late summer, when the formidable-looking caterpillar of *Chaerocampa elpenor* L. may be met with frequently on willow-herb and water-bedstraw beside the Cherwell and the Isis. *C. porcellus* L. comes occasionally to flowers at dusk, and its larva is found on *Galium verum* at Tubney and elsewhere. Of the rare *C. celerio* L. there is but one record, but *Phryxus livornica* Esp. occurred at Abingdon in 1883, and a beautiful specimen of this rare immigrant was taken by Mr. A. H. Hamm in South Oxford on 13th May, 1922. *Deilephila galii* Rott. has been seen on the wing in a garden at Summer-town, and the 'Humming-bird Moth,' *Macroglossa stellatarum* L., in some years is a frequent garden visitor; *Hemaris fuciformis* L. is common in most woods in early summer, and its larva has been taken freely at Tubney Wood on low-growing honeysuckle; its congener *H. bombylifformis* Esp. is less frequently met with.

The Notodontidae are also well to the fore, the two commoner 'Kittens,' *Cerura furcula* L. and *C. bifida* Hb.,

occurring sparingly at gas-lamps and on the trunks of willows and poplars, and the 'Puss,' *Dicranura vinula* L., much more frequently, especially as a larva; the 'Lobster Moth,' *Stauropus fagi* L., though by no means as common as in the Reading district, has been taken on several occasions in Bagley Wood, and more than once on gas-lamps in the City itself. *Drymonia trimacula* Esp. occurs rarely in Bagley and Hen Woods, and *D. chaonia* Hb. is an occasional visitor to gas-lamps, with *Ptilodontis palpina* L., *Phaeosia tremulae* Cl. and *Notodonta ziczac* L. fairly commonly, and less frequently *P. dictaeoides* Esp., *N. dromedarius* L., *N. trepida* Esp. and *Lophopteryx camelina* L. *Pygaera curtula* L. has been taken at Shotover and at Boar's Hill, and in most of the woods *Habrosyne derasa* L. and *Thyatira butis* L. may be taken in abundance at 'sugar.' The beautiful *Palimpsestis octogesima* Hb. sometimes comes to this attraction, as well as to light, and *Polyploca ridens* F. has been found on oak trunks in Bagley and Tubney Woods.

Orgyia gonostigma L. has occurred in the larva stage at Bagley Wood, whence also *Dasychira fascelina* L. has been reported, and *Lymantria monacha* L. is not scarce there and at Hen Wood on tree-trunks in July. The larva of *Trichiura crataegi* L. is found, sometimes not rarely, on crab-apple, blackthorn, etc., in early summer, and the perfect insect occasionally comes to the city gas-lamps, which in some years attract *Poecilocampa populi* L. quite numerously in November and December. The gregarious larva of *Eriogaster lanestris* L. has been found commonly on blackthorn, but *Lasiocampa quercus* L. and *Saturnia pavonia* L. are apparently much scarcer here than in most localities; indeed, there is no recent record of the occurrence of the latter species. *Gastropacha quercifolia* L., the well-known 'Lappet Moth,' is not uncommon, and sometimes comes to light. The 'Hook-tips,' *Drepana falcataria* L., *D.*

binaria Hufn. and *D. cultraria* F. are to be taken at Tubney and other well-wooded places, with *Nola strigula* Schiff., the beautiful green *Hylophila bicolorana* Fuesl. (most frequently beaten off oaks in the larva stage) and the variable *Sarrothripus undulanus* Hb., all three of these being somewhat scarce. *Phragmatobia fuliginosa* L. and *Parasemia plantaginis* L. are both common in Tubney Woods, the latter in some seasons especially so, and the gorgeous 'Scarlet Tiger,' *Callimorpha dominula* L., occurs somewhat locally at Cothill and Weston-on-the-Green, the larva being most partial to the Hemp-Agrimony, *Eupatorium cannabinum*. The 'Cinnabar Moth,' *Hyposcritia jacobaeae* L., occasionally appears in extraordinary profusion, when the swarming larvae clear off every leaf of their food-plant, *Senecio Jacobaea*, over extensive areas, and are even to be found abundantly on the naturalized *S. squalidus* on walls in the City. *Comacla senex* Hb. flies in wet places at Cothill, and the pale race *stramineola* Dbld. of *Lithosia griseola* Hb. occurs not rarely with the typical form; *L. sororcula* Hufn. is not uncommon at Bagley Wood, and *L. complana* L. and *Cybosia mesomella* L. in heathy places near Tubney.

The NOCTUINA are well represented in the district, and 'sugaring' in the woods, notably those at Boar's Hill and near Tubney, for the members of this group of Moths, is usually highly remunerative. *Demas coryli* L. has been found not rarely in the larval stage at Wytham Park and elsewhere; *Acronycta leporina* L. and *A. aceris* L. may be found sparingly at rest on tree-trunks; *A. ligustri* F. sometimes comes rather freely to sugar, and the scarce *A. alni* L. has occurred singly at Cothill and Tubney, and its most conspicuous larva has been found, usually on hazel, on several occasions in recent years. A brownish form of *Agrotis vestigialis* Rott., usually a littoral species,

is by no means rare at Tubney; *A. cinerea* Hb. has once occurred at Wytham Park; *A. obscura* Brahm has been taken rather freely at sugar near Abingdon, and Mr. E. G. R. Waters once captured the uncommon *A. simulans* Hufn. at flowers of the Red Valerian (*Centranthus ruber*) in his garden in North Oxford. The local *Noctua stigmatica* Hb. and *Triphaena orbona* Hufn. (*subsequa* Hb.), with the handsome *T. fimbria* L. and *Eurois prasina* F., are attracted to sugar in the Tubney Woods, where *Aplecta tinctoria* Brahm may be taken as a larva in early spring. *A. advena* F. frequents gardens, *Mamestra dissimilis* Kn. comes to sugar on trees near the Cherwell, and this attraction produces the very pretty *M. genistae* Bkh. quite freely at Hen Wood at times. *Neuria reticulata* Vill. is also a 'sugar' insect, and *Epineuronia popularis* F. is mentioned chiefly on account of its abundance in certain years, when it becomes a nuisance from its habit of flying into lighted rooms and blundering into incandescent gas-mantles. *Tholera cespitis* F. and *Aporophyla lutulenta* Bkh. are much less common, the latter being also found on ivy-bloom; *Apamea ophiogramma* Esp. has been taken in Oxford by Mr. Waters; *Xylophasia sublustris* Esp. comes to sugar not rarely, and the variable *Polia chi* L., which is here nearly at the southern limit of its distribution in Britain, is common on walls and tree-trunks in August, the ground-colour being usually nearly pure white, a very pretty form. *Brachionycha* (*Asteroscopus*) *sphinx* Hufn. is a common 'gas-lamp' insect in November, and *Agriopis aprilina* L. abounds at sugar in the oak-woods a little earlier in the season, when the dark form *capucina* Mill. of *Miselia oxyacanthae* L. is not rarely met with. The northern *Hydroecia petasitis* Dbld. has more than once been taken at light. The larva of *Nonagria geminipuncta* Hatch. burrows in the stems of reeds at Cothill, and *Coenobia rufa* Haw. flies freely before

dusk in Bullingdon (or Hogley) Bog, where Mr. A. H. Hamm has taken the fen-loving *Tapinostola hellmanni* Eversm.; two other marsh-frequenting species, *Calamia lutosa* Hb. and *Leucania impudens* Hb., have occurred not rarely near the 'Ruskin Reserve' at Cothill. *Panolis griseovariegata* Hufn. (*piniperda* Panz.) is not very common as yet, despite the extensive planting of Conifers in the woods, but all the species of *Taeniocampa*, with the exception of *opima* Hb., are to be found more or less plentifully at sallow-bloom in the spring, the larva of *T. populeti* F. being common on poplars in Bagley Wood. There are single records of *Dicycla oo* L. and *Dyschorista suspecta* Hb. for the District; the beautiful *Cosmia diffinis* L. comes sparingly to sugar and light, and the larva of *Plastenis retusa* L. has been found on sallows. *Cirrhoedia xerampelina* Hb. is occasionally taken at gas-lamps. Nearly all the Noctuae associated with autumnal work at ivy-bloom occur in greater or less abundance, and among these may be mentioned the pretty and very variable *Xanthia aurago* F., formerly not rare at Wood Eaton, but taken more freely at sugar near Woodstock in company with *X. citrugo* L. *Hopiorina croceago* F. is not scarce both before and after hibernation, and the much scarcer *Orrhodia rubiginea* F. has occurred at least once in the District. *Lithophane semibrunnea* Haw. is taken sparingly on ivy-bloom at Wood Eaton and elsewhere, and *L. socia* Rott. is reported from Boar's Hill, where the beautiful caterpillar of *Cucullia chamomillae* Schiff. may be found on *Matricaria* in June. The larva of *Pyrria umbra* Hufn. is also to be swept freely enough (though too often parasitized) from the rest-harrow, *Ononis spinosa*, in late summer. *Acontia luctuosa* Esp., not rare on the Berkshire chalk-downs, has been taken by Mr. Waters at Holton Pits near Wheatley, and *Hydrelia uncula* Cl. was formerly common at Headington Wick, but

has not been seen there of late years. The beautiful *Plusia moneta* F., which first made its appearance as a British insect some thirty years ago, has quite taken possession of the Oxford gardens where *Aconitum* and its allies are grown, the green larva (which is very easily reared) at times causing no small damage to these plants by eating the undeveloped flowers. *P. iota* L. and *P. pulchrina* Haw. are both fairly common, but the brilliant *P. festucae* L. is but rarely met with here. The 'Red Underwing,' *Catocala nupta* L., varies in abundance from year to year, but in some seasons is so common as to admit of four or five specimens being seen on a telegraph-post at once; the much more local and scarce *C. promissa* Esp. was taken by the late Mr. A. Sidgwick at Hen Wood, and more recently at Waterperry Wood by Mr. Waters. An example of the rare *C. fraxini* was seen, but unfortunately not captured, by Mr. A. W. Pickard-Cambridge on Headington Hill in the autumn of 1917. *Toxocampa pastinum* Tr. is widely distributed and not rare in boggy places, as at Cothill, etc., where the little *Hypenodes costastrigalis* Steph. has also occurred; the curious *Laspeyria flexula* Schiff. comes sparingly to light, and *Brephos parthenias* L., with its less common congener *B. notha* Hb., may be seen on the wing at Bagley Wood on bright days in March and April.

Many interesting species of the GEOMETRINA are also to be met with in the Oxford District. The larva of the fine *Geometra papilionaria* L. is sometimes fairly common on small birch bushes at Cothill and Tubney Wood, the perfect insect being less frequently found; *G. vernaria* Hb. comes to light at Summertown not rarely, and *Euchloris* (*Phorodesma*) *pustulata* Hufn. occurs in Bagley and other woods, with many of our species of *Acidalia*; *A. inornata* Haw., a local insect, is taken at what remains of Stow Wood near Beckley, and at Wytham Park, and *A. immutata* L. is

common in damp spots at Cothill. *Minoa murinata* Scop. is found among *Euphorbia amygdaloides* in some of the woods, and the little black *Odezia atrata* L. abounds on Shotover Hill and at Pixey Mead near Yarnton. The chalk-frequenting *Ortholitha bipunctaria* Schiff. has been found not rarely at Holton Pits, and Bagley Wood produces *Lobophora polycommata* Hb. and *L. carpinata* Bork., the latter in plenty; *L. viretata* Hb. has occurred at Boar's Hill and on the railings of the University Park, *L. halterata* Hufn. among aspens at Cothill and Tubney, and *L. sexalisata* Hb. at Bagley Wood, where the beautiful *Eucosmia undulata* L. has been taken among willows. *E. certata* Hb. is not uncommon in the University Park, and *Scotosia retulata* Schiff. among buckthorn at Wood Eaton and elsewhere; *Eustroma silaceata* Hb. may be taken at Bagley and Wytham Woods among *Epilobium angustifolium*. The common *Cidaria truncata* sometimes varies to an entirely black form; this tendency to melanism is exhibited in several other species of moths in the District, very dark specimens of *Miana strigilis* Cl., *Eupithecia rectangulata* L., *Oporabia dilutata* Bkh., *Cheimatobia brumata* L., *Hybernia marginaria* Bkh. and *Phigalia pedaria* F. being frequently taken, and the melanic form *doubledayaria* Mill. of *Pachys betularia* L. is now at least as common as the normal insect. The recently recognised (as British) *Thera variata* Schiff. is fairly plentiful among spruce firs at Wytham Park. *Eulype hastata* L., previously somewhat scarce, became exceedingly plentiful some ten years ago when the woods at Tubney were thinned out and small birch bushes sprang up in the openings, but has recently diminished in numbers. *Mesoleuca albicillata* L. is not rare in Bagley Wood, and Mr. Waters has taken *Pernoptilia* (*Camptogramma*) *fluviata* Hb. in the City; *Abraxas sylvata* Sc. is less common than in many places, occurring sparingly near Cothill, where

Coremia quadrifasciaria Clerck is also to be found. The larvae of *Perizoma bifasciata* Haw. may be obtained in numbers from the flowers and seeds of *Bartsia Odontites* in the autumn, *Asthena blomeri* Curt. has occurred among wych-elms at Bagley, and the rare *Eupithecia insigniata* Hb. (*consignata* Bkh.) was once taken by the late Mr. A. Sidgwick flying at dusk in Marston Lane. Other noteworthy members of this large genus occurring here are *scabiosata* Bkh., *haworthiata* Stt., *pusillata* F. (common among spruce firs at Bagley and Wytham Woods), *lariciata* Frr., *subciliata* Gn., *succenturiata* L., *irriguata* Hb., *dodoneata* Gn., *coronata* Hb., etc., and there is a record of the local *Collix sparsata* from 'near Wytham' by Mr. G. D. H. Carpenter. *Cabera rotundaria* Haw. is noted from Boar's Hill, and has been bred rather freely by Mr. Waters. The 'Thorns' of the genera *Selenia* and *Ennomos* are well represented in the District, all the members of the latter genus except *E. autumnaria* Wernb. occurring on gas-lamps in late summer, and occasionally coming into lighted rooms. *Eurymene dolobraria* L. is not rare in Bagley Wood, where *Apocheima hispidaria* F. has been more than once taken freely on oak trunks early in the year; it sometimes comes to light in the City, with, much more frequently, *Pachys strataria* Hufn. *Boarmia abietaria* Hb. and *B. roboraria* Schiff. have occurred at Hen Wood, and the latter has been taken at Waterperry Wood, where *Tephrosia consonaria* Hb. is also found; *T. luridata* Bkh. is common at Hen Wood and elsewhere. *Chiasma clathrata* L. and *Ematurga atomaria* L., though both are abundant species, deserve mention for the beautiful range of variation which they present in the District; an almost spotless black specimen of the former was taken some years ago near Abingdon by the present writer.

Of the well-known 'Burnets' and 'Foresters,' there are

flourishing colonies of *Zygaena lonicerae* Esp. at Shotover Hill and on the railway-bank near Yarnton, and of *Z. trifolii* Esp. at Bagley, Tubney, Cothill and elsewhere, fine confluent varieties of the latter species often occurring at the last-mentioned locality. *Ino statices* L. is locally plentiful in some years at Tubney and Bagley Wood: where *Cochlidion limacodes* Hufn. has been but rarely taken. *Cossus cossus* L. (*ligniperda* F.) and *Zeuzera pyrina* L. are by no means as common here as they are in many localities; indeed, a few more trees infested with the larva of the former moth would be heartily welcomed by the local Coleopterists.

MICRO-LEPIDOPTERA

BY E. G. R. WATERS

OXFORD may be considered a favourable and representative centre for the study of the Micro-Lepidoptera of southern England. True, the Oxford District has certain obvious limitations. At a distance of some sixty miles from the coast, few of the many species which require maritime plants or sea air can be expected to occur. There are no extensive heaths, moors or pine woods. Ericetal plants such as *Erica*, *Vaccinium*, *Myrica*, *Salix repens* and *Genista anglica*, as well as *Pyrus Aucuparia* (in a wild state), *Rhamnus Frangula* and *Solidago Virgaurea*, all much favoured as food-plants by Micro-Lepidoptera, are either absent or extremely rare. Nevertheless, the flora is varied and abundant, including many local plants, and the Micro-Lepidoptera in consequence are exceptionally plentiful and interesting. To use botanical terminology, the district is rich in pascual, glareal and sylvestral species, while paludal species are also fairly well represented. The many sheltered woods and copses, rough pastures and swampy meadows, which are the principal habitats of these delicate and local insects, have been much reduced by the constant advance of cultivation, cattle, building, and (most destructive of all) golf-links; but the remarkable concentration of lepidopterous life in some of the surviving localities partly compensates for what they have lost in extent.

The Pyralidae, Pterophoridae, Sesiidae and larger species of Tortricidae occurring around Oxford have been fairly well known for several decades, and may be found well represented in the locally-formed collections now housed in the University Museum, notably those of the late Messrs. A. Sidgwick and W. G. Pogson-Smith and Professor W. M. Geldart. The Tineina and obscurer Tortricidae have yielded their rich harvest during the last few years only, as a result of intensive study, and many discoveries are still made annually. The Oxford list now includes many insects that are rare, or extremely local, or much overlooked, and some that have not hitherto been recorded from any other part of the British Isles. The most prolific groups of all, and those in which most discoveries are made, are the smaller Tineina; the genus *Coleophora* is represented by about 40 species, *Elachista* by 26, *Lithocolletis* by nearly 40, and *Nepticula* by no fewer than 53.

As might be expected from the geographical situation of the district, its Micro-Lepidoptera are essentially south-eastern in character. Whereas the Thames Valley forms a natural channel of communication between Oxford and the south-eastern counties, on the west and north-west the broad bare slopes of the Cotswolds are an insuperable barrier to many of these fragile insects. Quite a number of species which in England are restricted to the southern or eastern counties have their most northerly or westerly station (so far as is known) in the vicinity of Oxford, for instance *Conchylis flaviciliana* Wilk., *Grapholitha microgrammana* Gn., *Cerostoma horridella* Tr., *Stathmopoda pedella* L., *Coleophora potentillae* Elisha, *Gracilaria omissella* Stt. and *Nepticula quinquella* Bedell. Exceptionally, a few whose normal home is in the western counties have reached the Oxford district: *Diasemia litterata* Sc. (an old record only), *Polychrosis euphorbiana* Frr. (one in Bagley Wood,

1921), and *Anybia epilobiella* Roemer (a permanent inhabitant). No northern species, however, is known to reach its southern limit here, except perhaps *Bryotropha politella* Stt., which is found at Boar's Hill and Streatley, but may easily have been overlooked in other parts of southern England.

A brief survey of the resources of the district may well begin with Oxford itself. Of the Pyralidae and Tineidae which inhabit houses, stores and mills, little need be said ; the usual species are far too common, but the rarer species have not been noticed—unless the very scarce *Pyralis lienigialis* Z. (probably a refuse-feeder), which has been taken several times in North Oxford, be included under this heading. The larva of *Oinophila v-flavum* Hw. undoubtedly thrives in Oxford wine-cellars on the corks of champagne bottles, though the moth has not yet been bred. The two hive-dwellers, *Galleria mellonella* L. and *Achroia grisella* F., have been bred freely from old honeycomb at Summertown. *Scoparia angustea* Stph., *S. frequentella* Stt., *Bryotropha domestica* Hw. and *B. affinis* Dgl. are common on walls, on which *Glyphipteryx equitella* Sc. also occurs. The extensive parks and gardens, public and private, surrounding Oxford produce many species, some of them pests ; laburnum leaves are everywhere disfigured by larvae of *Cemistoma laburnella* Stt., privet and lilac by *Gracilaria syringella* F., evergreen oak by *Lithocolletis messaniella* Z., *Euonymus* by *Yponomeuta cognatellus* Hb., and ivy by *Tortrix forsterana* F. *Acalla variegana* Schiff., *Tortrix bergmanniana* L. and other common Tortricids are great enemies of the rose-grower, and the mines of *Coleophora gryphipennella* Bouché, *Nepticula centifoliella* Z. and *N. angulifasciella* Stt. abound in rose-leaves. In the University Parks may be found *Acrolepia pygmaeana* Hw. and many noteworthy species of *Coleophora*, *Nepticula*,

Lithocolletis and *Ornix*; the mine of *Heliozela betulae* Wood has also been seen there on birch. It is interesting to notice how readily many species transfer their affection from their normal food-plants to kindred but exotic trees and shrubs planted in the Parks. The fruit-trees which give parts of Oxford an orchard-like character support *Grapholitha woerberiana* Schiff., *Sesia myopaeformis* Bkh., *Yponomeuta* ? *malinellus* Z., *Argyresthia cornella* F., *Gelechia rhombella* Schiff., *Recurvaria nanella* Hb., *Blastodacna vinolentella* HS., *Ornix guttea* Hw., *Lithocolletis blancardella* F., *Lyonetia clerkella* L., *Nepticula pomella* Vaughan, *N. minusculella* HS., and many others. *Dichrorampha quaestionana* Z., *Pamene rhediella* Cl., *Sesia tipuliformis* Cl. and *Plutella porrectella* L. also occur in gardens. Rubbish-dumps, plots of land awaiting the builder, and other waste places harbour colonies of *Platyptilia gonodactyla* Schiff. and *Epiblema brunnichiana* Froel. on coltsfoot, *Epiblema foenella* L. and *Gracilaria omissella* Stt. on mugwort, *Epermenia chaerophyllella* Goeze on *Umbelliferae*, *Coleophora lineolea* Hw. on *Ballota nigra* and *Stachys*, *Chrysopora stipella* Hb. and *Coleophora laripennella* Zett. on *Chenopodium*. *Gelechia atriplicella* F. has also been bred from *Chenopodium*, and there are records of the occurrence of *Chrysopora hermannella* F. and *Scythris chenopodiella* Hb.

Looking a little further afield, one may find widely distributed round Oxford hedge-frequenting species such as *Rhodophaea advenella* Zk., *Cnephasia nubilana* Hb., *Anisotaenia rectifasciana* Hw., *Olethreutes achatana* F., *Pamene spiniana* Dup., *Grapholitha janthinana* Dup., *Gelechia costella* Westw., *Spuleria aurifrontella* Hb., *Cemiostoma scitella* Z., *Bucculatrix crataegi* Z., and the sloe- and hawthorn-feeding species of *Argyresthia*, *Nepticula*, *Lithocolletis*, *Ornix* and *Swammerdamia*. *Bedellia somnulentella* Z. appears rare, though a stray specimen has been taken in

Bagley Wood. Old birds'-nests from the hedgerows produce quantities of *Tinea lapella* Hb. and *Monopis rusticella* Hb., and *Tinea semifulvella* Hw. is widely distributed. During or after a storm in the summer months, fences on the outskirts of Oxford may be found to swarm with small moths, driven from their usual hiding-places in trees and hedges to take shelter there; *Gelechia fugitivella* Z., *Stenolechia albiceps* Z., *Prays curtisellus* Don., *Borkhausenia unitella* Hb., *B. lunaris* Hw., *Blastodacna hellerella* Dup., *Coleophora badiipennella* Dup., *Argyresthia dilectella* Z., *Bucculatrix boyerella* Dup., and various species of *Elachista*, *Nepticula* and *Lithocolletis* may then be found in plenty. while *Phitheochroa rugosana* Hb., *Steganoptycha ratzeburgiana* Rtz. and *Brachmia gerronella* Z. have occasionally been obtained in the same way. On fences too may be seen *Narycia monilifera* Fourc. and its case-bearing larvae. Field-posts and open fences in the district sometimes swarm with larvae of the apterous and parthenogenetic Psychid, *Luffia ferchaultella* Stph., which also inhabits tree-trunks, old walls, and even (at Dorchester) old lichen-covered tombstones; while larvae of the rare *Bacotia sepium* Spr. have been found in some numbers on field-posts at Kennington. The remarkable larva of *Diplodoma marginepunctella* Stph. was found in 1922 on an open fence near Yarnton. Old thatches and ricks, especially in the neighbourhood of woods, give shelter to a large number of species, including *Crambus falsellus* Schiff., a score of *Depressariae*, *Borkhausenia minutella* L., *Mompha decorella* Stph., *M. subbistrigella* Hw., *Coriscium cuculipennellum* Hb., *C. brongniardellum* F., and *Tinea misella* Z., many of them being plentiful. *Herculia glaucinalis* L. has been taken in numbers at Boar's Hill, and *Hypsopygia costalis* F. in various localities, though not always in the vicinity of thatches or outbuildings. *Olethreutes nigri-*

costana Hw. is widely distributed among *Stachys sylvatica* growing by road-sides, and *Pterophorus lienigianus* Z. has been bred in plenty from larvae found on mugwort in ditches near Besselsleigh. On stitchwort *Gelechia maculea* Hw., *G. tricolorella* Hw., *Asychna modestella* Dup. and *Coleophora solitariella* Z. all occur in the district, but not so commonly as might be expected. In neglected and fallow tillage-fields may be found *Phlyctaenodes verticalis* L., *Olethreutes purpurana* Hw. and the common thistle-feeding Tortricids, also *Epiblema expallidana* Hw., *Conchylis implicitana* Wck. (around Boar's Hill), and the pea moth *Grapholitha nigricana* Stph. *Olethreutes ericetana* Westw. has been captured once only.

The banks of the Thames, the Cherwell and the Oxford-Banbury Canal, the minor streams and ditches connected with them, and the shallow ponds bordering railway embankments provide many water- and marsh-frequenting Micro-Lepidoptera with a permanent home. The aquatic *Acentropus niveus* Oliv. occurs on both rivers, and its semi-aquatic relatives *Schoenobius forficellus* Thnb., *Donucaula mucronellus* Schiff., *Cataclysta lemnata* L., *Nymphula stagnata* Don. and *N. stratiotata* L. are all locally common. *Scoparia pallida* Steph. may be found along the Canal and elsewhere. *Bactra furfurana* Hw., *Conchylis udana* Gn., *Orthotaelia sparganella* Thnbg. and an undescribed species of *Coleophora* are common in a meadow by the Isis. *Olethreutes antiquana* Hb. has been taken along ditches where *Stachys palustris* grows. *Cacoecia costana* F., sometimes very fine, may be bred from various food-plants. *Chorentis myllerana* F. is locally common on *Scutellaria galericulata*, *Mompha ochraceella* Curt. among *Epilobium hirsutum*, and *Elachista poae* Stt. on *Glyceria aquatica*. One of the most interesting localities in the district (in spite of repeated fires) is the tract of calcareous peat at Cothill, including the

Ruskin Reserve ; here *Glyphipteryx schoenicolella* Stt. may be found among *Schoenus nigricans* ; *Acalla shepherdiana* Stph. and *Nepticula ulmariae* Wck. among meadow-sweet ; *Pyrausta aurata* Sc. and *Conchylis notulana* Z. among marsh *Labiatae* ; *Perinephila lancealis* Hb., *Pterophorus microdactylus* Hb., *Conchylis rupicola* Curt. and *Coleophora troglodytella* Dup. on hemp-agrimony ; *Olethreutes fuligana* Hb. among *Ajuga* ; *Elachista paludum* Frey on *Carex paniculata* ; also *Nymphula nympheata* L., *Crambus selasellus* Hb., *Elachista subalbidella* Schläg., *Gracilaria phasianipennella* Hb., etc. Many of these species occur also in a boggy valley near South Hinksey, where in addition *Pionea crocealis* Hb., *Pterophorus lithodactylus* Tr. and *Hysterosia inopiana* Hw. are to be taken among *Pulicaria dysenterica*, and *Grapholitha gallicana* Gn., *Depressaria angelicella* Hb. and *Epermenia illigerella* Hb. among *Angelica*. A spongy bog between Headington and Cowley, almost the only one of its kind in the district, though now greatly deteriorated, still produces *Scoparia pallida* Stph., *Crambus uliginosellus* Z., *Bactra furfurana* Hw., *Epermenia illigerella* Hb., and other local species, formerly also *Elachista albidella* Tgstr. among cotton-grass. Willow- and sallow-beds in the river valleys produce *Acalla hastiana* L. (sparingly), *Olethreutes semifasciana* Hw., *Epiblema semifusca* Stph., *Sesia formicaeformis* Esp., *Gelechia notatella* Hb., *G. sororculella* Hb., *Lithocolletis viminetorum* Stt., *Phyllocnistis saligna* Z. and some interesting Nepticulids. *Trochilium crabroniformis* Lewin figures in the Oxford list, and could doubtless still be found. Among the poplars, black and grey, which grow in marshy or moist localities may be found *Trochilium apiformis* Cl. (whose burrows are to be seen in the trunk of almost every poplar in the district), *Steganoptycha oppressana* Tr., *S. minutana* Hb. (rare), *Gypsonoma aceriana* Dup., *G. neglectana* Dup., *Gelechia nigra* Hw.,

Batrachedra praeangusta Hw., *Lithocolletis comparella* Z., *Nepticula trimaculella* Hw. and *Phyllocnistis suffusella* Z. A species of *Nepticula* not yet identified occurs on grey poplar at Cothill.

The most conspicuous of the pratal species are the common Crambids or grass-moths, which are only too plentiful. *Conchylis hartmanniana* Cl., *Nemotois cupriacellus* Hb. and *N. minimellus* Z., all striking insects, frequent meadows where *Scabiosa succisa* grows freely, but all are local; *Stenoptilia bipunctidactyla* Hw. is fairly common in similar spots. *Adela rufimitrella* Sc. is frequently seen in the spring at flowers of *Cardamine pratensis*. *Conchylis enicana* Dbld. is general among marsh thistles. *Olethreutes rivulana* Sc. is local. Among *Genista tinctoria* in meadows beyond Forest Hill may be found *Gelechia lentiginosella* Z., *Anarsia genistae* Stt., *Depressaria atomella* Hb. and *Cemistoma wailesella* Stt., and in the same locality *Gracilaria ononidis* Z. occurs sparingly. *Elachista luticomella* Z., *E. gleichenella* F., *E. perplexella* Stt., *E. triatomea* Hw., and many others of the same genus may be taken, often abundantly, in grassy spots which escape grazing or cutting, and *Brachmia rufescens* Hw. is frequent in similar places. *Ochsenheimeria birdella* Curt. and *O. bisontella* Z. both occur in meadows, but are imperfectly known. *Xystophora lutulentella* Z., a rare species with obscure habits, has been captured on a few occasions in grassy places near Oxford.

For what may be termed pascual and glareal Micro-Lepidoptera there are many productive localities: on the north, the railway embankments in the neighbourhood of Wolvercote and Yarnton; on the east, the valleys and slopes descending from Shotover, Forest Hill and Stow Wood; on the west, the tracts of sandy and stony ground around Cumnor and Boar's Hill, and especially the narrow valleys down which watercourses run from these heights to

the Thames. In such places may be found *Myelois cribrella* Hb., often plentiful among the larger thistles; *Nomophila noctuella* Schiff. and *Pionea ferrugalis* Hb., both irregular in occurrence; *Scoparia cembrae* Hw.; several attractive 'Plumes,' including *Oxyptilus teucris* Jordan (common among wood-sage), *Platyptilia bertrami* Rössl., *Marasmarcha phaeodactyla* Hb. and *Alucita tetradactyla* L.; many local Tortricids, including *Grapholitha pallifrontana* Z. (among *Astragalus glycyphyllos*), *G. internana* Gn. (on gorse), *Lipoptycha saturnana* Gn. (on tansy), *Olethreutes sellana* Gn., *Cnephasia pasivana* Hb., *C. longana* Hw., *Acalla aspersana* Hb., *Grapholitha aurana* F., and most of the British species of *Dichrorampha*; *Sesia ichneumoniformis* F., found sparingly in an old quarry near Headington; and interesting Tineina such as *Anacamptis vorticella* Sc. and *A. taeniolella* Z. on *Lotus*, *Gelechia acuminatella* Sircom and *Coleophora therinella* Tngstr. on thistles, *Xystophora atrella* Hw. and *Depressaria liturella* Hb. on *Hypericum*, *Stephensia brunnickiella* L. on *Calamintha Clinopodium*, *Pancalia leuwenhoekella* L. on *Viola hirta* (often plentiful), *Cemiostoma spartifoliella* Hb. and *Trifurcula immundella* Z. on broom, *Bryotropha decrepidella* HS. var. *lutescens* Const., *Alabonia geoffrella* L., *Bucculatrix nigricomella* Z., *B. cristatella* Z., *Opostega salaciella* Tr., and many species of *Coleophora*, *Elachista* and *Nepticula*. Special mention should be made of the attractive Conchylinae, which are particularly well represented; the species found in these localities include *Euxanthis zoegana* L., *E. straminea* Hw., *Conchylis badiana* Hb., *C. smeathmanniana* F., *C. hybridella* Hb. (rare), *C. manniana* F.R., *C. ciliella* Hb. (common among cowslip), *Lozopera francillana* F. (uncommon) and *L. dilucidana* Stph. *Conchylis flaviciliana* Wilk., an extremely local insect, confined to south-east England and unknown abroad, was discovered in 1925 among field scabious on the

outskirts of Bagley Wood ; it is perhaps the most strikingly pretty of the whole genus. In the same place were found several examples of *Grapholitha microgrammana* Gn., usually regarded as a coast species, as well as *Coleophora frischella* L. and other unexpected insects. A spot of exceptional interest is Holton Pits near Wheatley, where the coralline oolite bears a flora resembling that of the chalk downs, and a number of species which frequent calcareous soil may be found, for instance *Pyrausta nigrata* Sc., *Hypochalcia ahenella* Hb., *Steganoptycha fractifasciana* Hw., *Gelechia artemisiella* Fr., *Coleophora lixella* Z., *Elachista bedellella* Sircom, *E. subnigrella* Dgl. and *Scythris fuscuprea* Hw.

Ericetal species are poorly represented, but *Gelechia ericetella* Hb., *Aristotelia ericinella* Dup. and *Coleophora juncicolella* Stt. occur on patches of heath at Tubney, Boar's Hill and Bladon Heath. *Ancyliis uncana* Hb. formerly existed at Boar's Hill, but has not been seen for many years. The sandy tracts at Boar's Hill and Tubney are, however, interesting in other ways. *Homocosoma nebulella* Hb. used to be found there in plenty, and still occurs. Among ragwort *H. binaevella* Hb. has been taken, *Conchylis dubitana* Hb. is sometimes plentiful, *Steganoptycha nigromaculana* Hw. and *Bryotropha senectella* Z. are frequent. *Bryotropha desertella* Dgl. and *Gelechia marmorea* Hw., two species usually stated to be confined to coast sandhills, occur in both localities, the former in great abundance, the latter not scarce ; they are accompanied by several other local Gelechiids, including *G. distinctella* Z., *G. velocella* Dup., *G. diffinis* Hw., *Xystophora tenebrella* Hb., *X. unicolorella* Dup. and *Sophronia semicostella* Hb. *Crambus pinellus* L. has been taken in both places. On walls at Tubney may be found *Bryotropha basaltinella* Z., *Narycia monilifera* Fourc. and a parthenogenetic species of *Solenobia* ; strange

as it may seem, no other station for a *Solenobia* is known in the Oxford district. In the same locality a form of *Scoparia dubitalis* Hb. approaching very closely to var. *purbeckensis* Bnks., as found on the Dorset coast, was recently captured; *Depressaria ciliella* Stt. is sometimes plentiful, and no other locality is known around Oxford for *D. umbellana* Stph., *D. chaerophylli* Z., *D. pimpinellae* Z. and *D. discipunctella* Hs. The Lithocolletids and Nepticulids found there are also exceptionally interesting.

The best-represented group of all, namely the sylvestral species, remains to be dealt with. In nearly all directions from Oxford are extensive woods which, though now circumscribed and difficult of access, are still the happiest hunting-ground of the micro-lepidopterist. Wytham Woods, the most picturesque, are the least productive, though many of the usual woodland species occur there, and the open ground at the summit has produced *Pempelia dilutella* Hb., *Olethreutes cespitana* Hb., *Conchylis roseana* Hw., *Apodia bifractella* Dgl., *Gelechia sequax* Hw., *Elachista subocellea* Stph., *Adela croesella* Sc., etc. Bladon Heath, near Woodstock, is a locality for *Depressaria pulcherrimella* Stt. and *Coriscium sulphurellum* Hw., but was partly spoilt by the felling of trees during the war. Bagley Wood, however, and Tubney Wood, and the wooded country around Cothill and Boar's Hill, are an unfailing source of interest, and have their counterpart on the Oxfordshire side of the river in the great circle of woods beyond Forest Hill and Stanton St. John. Oak-feeding species are everywhere predominant, and very few of those that figure in the British list are missing. *Tortrix viridana* L., assisted by other common Tortricids, frequently denudes the oak-trees over large areas. The richly-coloured Phycids, *Acrobasis zelleri* Rag., *A. consociella* Hb. and *Phycita spissicella* F. are often abundant, and *Cryptoblabes bistriga* Hw. is

locally common in Bagley Wood. The oak-trunks sometimes teem with *Scoparia crataegella* Hb., *S. ambigualis* Tr. and *S. truncicolella* Stt., and a fine large *Scoparia* usually assigned to *basistrigalis* Knaggs occurs in Bagley Wood. The showiest of the Tortricids are *Ancylis mitterbacheriana* Schiff., *Olethreutes arcuella* Cl. (which sometimes swarms), *O. profundana* F., and *Acalla literana* L., while the more local *Dichelia grotiana* F., *Pamene fimbriana* Hw. and *P. nitidana* F. may be taken commonly in restricted spots, and *P. gallicolanu* Z. has occurred. The Tineina include several interesting Gelechiids: *Acanthophila alacella* Dup. (not common, but widely distributed), *Stenolechia gemmella* L., *Gelechia scalella* Sc. (locally common), *G. luculella* Hb. (abundant), *G. triparella* Z., *Psoricoptera gibbosella* Z., etc. *Argyresthia glaucinella* Z. has not been found in the woods, but has occurred on oak at Water Eaton. The birch-feeding species are not so fully represented, but *Salebria betulae* Goeze is common in the larval stage, *Epiblema demarniana* F.R. has been taken near Hen Wood, *Olethreutes corticana* Hb. at Cothill and in Bagley Wood. *Lobesia permixtana* Hb., *Epiblema bilunana* Hw., *E. similana* Hb., and *Conchylis nana* Hw. are well distributed, and *Phylloporia bistrigella* Hw. occurs in Bagley and Waterperry Woods. The Eriocraniids are comparatively local and not very plentiful, but include *Eriocrania sparmannella* Bosc., *E. salopiella* Stt., *E. sangii* Wood and an unpublished species. The only noteworthy ash-feeder is *Zelleria hepariella* Stt., which is found in Bagley Wood. Among alders in Bagley Wood or at Cothill may be taken *Epiblema sordidana* Hb., *E. immundana* F.R., *Stathmopoda pedella* L., *Heliozela resplendella* Stt., *Bucculatrix cidarella* Z. and *Scoliaula quadrimaculella* Boh.; *Nemophora metaxella* Hb. also frequents alder-beds. On beech the principal Tortricid is *Acalla sponsana* F., and *Carpocapsa grossana* Hw. has

occurred in Wytham Woods. On elm several species of *Coleophora* occur; but lack of space forbids an account of the many interesting Coleophorids, Lithocolletids, Nepticulids and other small Tineina attached to the various trees. *Tortrix diversana* Hb. has been taken in the past. Among salallows growing in the woods are found *Cacoecia crataegana* Hb., *Olethreutes salicella* L., *O. capreana* Hb., *Grapholitha servillana* Dup., *Pamene germana* Hb., *P. populana* F. (scarce), *Ancyliis diminutana* Hw., *Steganoptycha cruciana* L., etc.; and on aspen, *Olethreutes branderiana* L., *Epiblema ophthalmicana* Hb., *Ancyliis laetana* F., and two local Nepticulids. On sycamore *Lithocolletis geniculella* Rag. (new to Britain) has been found rather commonly in Bagley and Tubney Woods; larvae of *Pamene regiana* Z. may be found under the bark; *Acalla sponsana* F. and *Tortrix forskaleana* L. are general on this tree, as well as on maple. On buckthorn at Cothill may be found *Blastodacna rhamniella* Z., *Bucculatrix frangulella* Goeze and *Nepticula catharticella* Stt. On *Viburnum Lantana* in the woods of North Berkshire *Acalla logiana* Schiff., *Sesia andrenaeformis* Lasp. and *Lithocolletis lantanella* Schrk. are widely distributed, and the two latter are also found on *Viburnum Opulus*. *Alispa angustella* Hb., *Yponomeuta plumbellus* Schiff. and *Theristis mucronella* Sc. occur on spindle in the same area. *Argyresthia anderegiiella* Dup. is not uncommon on crab-apple trees in Bagley Wood. *Notocelia tetragonana* Steph. and *Tischeria angusticoella* Dup. occur locally on wild rose in woods on the Oxfordshire side of the river, *Eucosma ochroleucana* Hb. and *Grapholitha roseticolana* Z. are widely distributed, and several rose-feeding Nepticulids are plentiful. On honeysuckle *Grapholitha albersana* Hb., *Epitheatis mouffetella* Schiff. and *Perittia obscurepunctella* Stt. are fairly general; the same applies to *Pandemis corylana* F. and *Capua*

farillaceana Hb. on hazel, *Antispila pfeifferella* Hb. on dogwood, and *Schreckensteinia festaliella* Hb. on bramble. *Acalla cristana* F., the well-known 'button' moth, though usually scarce, is widely distributed in the district, frequenting old thickets of blackthorn; of the named aberrations of this most variable insect, twenty-five (about one-third) have been found around Oxford. Other blackthorn-feeding species to be found in their special localities are *Rhodophaea suarella* Zk., *Steganoptycha signatana* Dgl. (in a copse near Wytham), *Scythropia crataegella* L. and *Cerostoma horridella* Tr. Most of the other species of *Cerostoma* occur, though some are local; *C. sequella* F. is a conspicuous object on tree-trunks in the autumn, *C. scabrella* L. and *C. lucella* F. occur sparingly. *Tortrix bifasciana* Hb., always a scarce insect, has been taken in Bagley Wood.

Not all the sylvestral species, however, are tree-feeders. Among those attached to low-growing plants may be mentioned *Pyrausta fuscalis* Schiff., local among cow-wheat; *Alucita galactodactyla* Hb., plentiful in woods on burdock; *Cnephasia sinuana* Stph. and *Conchylis maculosana* Hw., both general on bluebell; *Olthreutes gentiana* Hb., common on teasle; *Psecadia decemguttella* Hb., local on *Lithospermum*; *Colcophora agrammella* Wood, locally common on *Juncus*; *Elachista taeniatella* Stt., local on *Brachypodium sylvaticum*; *E. magnificella* Tngstr., rather common on *Luzula sylvatica* in a small wood at Boar's Hill; *Incurvaria praelatella* Schiff., rather common in dense woods among wild strawberry, on which three species of *Nepticula* also occur; *Adela fibulella* F., on *Veronica Chamaedrys*; and especially the attractive Elachistids which feed on *Circaea* and sylvestral species of *Epilobium* (*Anybia epilobiella* Roemer, *Psecaphora terminella* Westw., *Mompha propinquella* Stt., *M. raschkiella* Z., *M. conturbatella* Hb., etc.), all of which can be obtained in plenty. *Pallodora*

cytisella Curt., a bracken-feeder, is not uncommon in rides in Bagley Wood, *Incurvaria luzella* Hb. and *I. rubiella* Bjerk. occur sparingly, *Acompsia einerella* Cl. and the showy little *Cosmopteryx druryella* Z. are found locally in grassy spots. *Micropteryx thunbergella* F. and *M. mansuetella* Z. are locally plentiful. Of the *Tineina* which feed in fallen leaves, *Adela degeerella* L. and *Nemophora swammerdam-mella* L. are common, *N. schwarziella* Z. and *Borkhausenia flavifrontella* Hb. less so; and *Incurvaria oehlmanniella* Tr. is sometimes plentiful in Waterperry Wood. The Psychids *Talaeoporia tubulosa* Retz. and *Fumea casta* Pall. are common. *Monopis weaverella* Scott, whose early stages seem to be unknown, is widely distributed in woods, but is usually mistaken for the common *M. rusticeella* Hb. Among the species that feed in rotten wood or fungi may be mentioned *Borkhausenia tinctella* Hb. and some others of the same genus, which are widely distributed; *Tinea parasitella* Hb., common in Wytham and Bagley Woods; *T. eorticella* Curt. and *T. fulvimitrella* Sodof., locally common in Bagley Wood. The burrows of *Sesia respiformis* L. and *S. euliciformis* L. may frequently be seen in oak and birch stumps respectively.

Although coniferous trees are not a characteristic feature of the district, a considerable number of fir- and pine-feeding Micro-Lepidoptera have become established on trees introduced into the woods. On Scotch fir at Tubney have been found *Dioryctria abietella* F.M., once only; the common species of *Evetria*, fortunately not plentiful; *Steganoptycha rubiginosana* HS., taken commonly in 1913; *Grapholitha coniferana* Rtz., not common; *Gelechia dodecella* L. and *Cedestis gysseleniella* Dup., fairly common. Larvae of *Hyphantidium terebrella* Zk., usually considered a rarity, have been found commonly in fallen spruce-cones in Bagley and Tubney Woods, while *Grapholitha strobilella* L.

can be bred from the cones in plenty. *Asthenia pygmaeana* Hb. is common among spruce in all the woods, and *Argyresthia glabratella* Z. threatens to become a pest on the same tree. In Bagley Wood *Pamene ochsenheimeriana* Z. and *Batrachedra pinicolella* Dup. are found commonly among firs, and *Pandemis cinnamomeana* Tr. occurs. On larch *Steganoptycha diniana* Gn., *Tmetocera lariciana* Hein., *Argyresthia atmoriella* Bnks. and *Coleophora laricella* Hb. are liable to be pests.

Only brief mention can be made of the chalk downs of Oxfordshire and Berkshire, extending from Chinnor to Goring and from Streatley to beyond Wantage respectively, or of interesting outlying localities such as Wychwood Forest, Cherbury Camp or the Wittenham Clumps, as none of these can strictly be included in the Oxford District. Were they included, many noteworthy Micro-Lepidoptera would be added to the local list. On the open downs occur *Pempelia ornatella* Schiff., *Crambus chrysonuchellus* Sc., *Pyrausta cingulata* L., *P. ostrinalis* Hb., *Oxyptilus parvidactylus* Hw., *Conchylis subbaumanniana* Wilk., *Epiblema caecimaculana* Hb., *Metzneria carlinella* Stt., *Ypsolophus schmidiellus* Heyd., *Depressaria nanatella* Stt., *D. douglasella* Stt., *Coleophora niveicostella* Z., *Cataplectica profugella* Stt., *Epermenia insecurella* Stt., *Nepticula filipendulae* Wk., *N. poterii* Stt., *Nemotois metallicus* Poda, etc.; in sheltered or bushy spots, *Psammotis hyalinalis* Hb., *Alucita baliodactyla* Z., *Ancylis derasana* Hb., and *Adela croesella* Sc. Among juniper *Conchylis rutilana* Hb. occurs, and the juniper-feeding species of *Argyresthia* are plentiful. In the beech-woods may be found *Tortrix bifasciana* Hb., *Borkhausenia panzerella* Stph., *Colcophora antennariella* Hs. (recently discovered in the Nettlebed district, and not known from any other British locality), *Ornix fagivora* Frey, *Micropteryx aureatella* Sc., etc. Cherbury Camp is a

locality for *Tortrix paleana* Hb., Streatley for *Steganoptycha pauperana* Dup., Bryotropa *similis* Stt., *Antispila treitschkiella* F.R. and *Gracilaria semifascia* Hw., Highmore for *Notocelia tetragonana* Stph. and *Gelechia scriptella* Hb., Watlington for *Pionea pandalis* Hb. and *Conchylis atricapitana* Stph., and the Chinnor district for *Notocelia incarnatana* Hb. and *Scythris fuscoacenea* Hw.

The melanic tendency visible among the Macro-Lepidoptera of the district may also be noticed among the Micro-Lepidoptera. The dark forms of *Prays curtisellus* Don. (ab. *rustica* Hw.) and *Lyonetia clerkella* L. (ab. *aereella* Tr.) are dominant, and the black form of *Chinabache fagella* F. (ab. *dormoyella* Dup.) has greatly increased in numbers in recent years. Melanic forms of *Cacoecia podana* Sc., *Gelechia marmorea* Hw. and *Lithocolletis schreberella* F. have been captured.

The following table indicates approximately to what extent the Micro-Lepidoptera of the British Isles are represented in the Oxford District. Owing to the absence of an up-to-date British list, and the existing uncertainty as to the limits of a number of species, complete accuracy of figures is not attainable. The 'Oxford District,' for this purpose, is taken to lie within a radius of seven miles from Carfax. When it is remembered how many of these insects are confined to particular spots in fens, salt-marshes, mountain districts, etc., the proportion occurring in this small area will appear relatively large.

	NO. OF SPECIES.	
	In Britain.	In Oxford District.
Pyrilidae.		
A. Galleriinae to Phycitinae -	89	35
B. Endotrichinae to Pyraustinae	72	36
Pterophoridae, Orneodidae - -	35	15
Tortricidae.		
A. Tortricinae - - - -	85	48
B. Conchylinae - - - -	49	26
C. Olethreutinae - - - -	214	128
Sesiidae - - - - -	14	9
Glyphipterygidae, Yponomeutidae, Plutellidae - - - -	77	52
Gelechiidae.		
A. Gelechiinae - - - -	136	61
B. Blastobasinae, Oecophorinae -	80	40
Elachistidae - - - - -	177	98
Gracilariidae - - - - -	83	61
Lyonetiidae - - - - -	26	16
Nepticulidae - - - - -	81	56
Psychidae - - - - -	21	7
Tineidae - - - - -	71	37
Eriocraniidae, Micropterygidae -	15	12
Total - - -	1325	737 (55.7%)

For convenience of reference, the divisions, generic and specific names used in Staudinger and Rebel's *Catalog der Lepidopteren des palaearktischen Faunengebietes*, 3rd edition (Berlin, 1901), have been adopted (except in the case of the Psychidae), although it is recognised that this catalogue is now in many respects out of date.

DIPTERA

BY A. H. HAMM

THESE probably form one of the most important groups of insects in the world, from both the biological and economic standpoint. Many species are the vehicles of some of the most malignant diseases to man and beast, though, fortunately, the residents in these islands are mainly free from such dire scourges. Agriculturists and horticulturists the world over, too, have to wage incessant warfare, or apply remedial measures, to keep in check other species that inflict damage on crops as well as on livestock.

Hitherto no list of the Diptera of the Oxford District has been published, though the present writer has had one in preparation for some years past, and it only awaits the revision of the current British List to complete the same in the near future. Over 1700 species are already known to him from the District, and when the many forms that still await determination have been named the total number will probably approach, if not exceed, 2000. The arrangement and nomenclature followed is mainly that of the late G. H. Verrall's *List of British Diptera* of 1901, but recent revisions of certain families have been followed.

To my past and present friends and colleagues of the Hope Department, who include Messrs. H. Britten, F.E.S., J. Collins, W. Holland, O. W. Richards, B.A., F.E.S., E. G. R. Waters, M.A., F.E.S., and Commander J. J.

Walker, M.A., F.L.S., the writer's best thanks are due for much help in collecting and for records contributed.

To Messrs. J. E. Collin, F.E.S. (BRACHYCERA); F. W. Edwards, B.A., F.E.S. (NEMATOCERA); Rev. A. E. Eaton, M.A., F.E.S. (Psychodidae); C. J. Wainwright, F.E.S. (Tachinidae), the writer wishes to express his deep sense of gratitude for the ready and willing assistance in the determination of the various groups of which they are the well-known specialists, for without their assistance the writer's task would have been impossible, and also to Prof. E. B. Poulton, F.R.S., for much kindly help and advice always freely given.

The name, in brackets, following a name or locality denotes the captor, in all other cases the present writer is responsible.

The following account of the Diptera observed in and around Oxford is necessarily brief owing to the restriction of space, and only such species are mentioned that are considered of more than passing interest.

NEMATOCERA

CECIDOMYIDAE

The larvae of this large and interesting family are the cause of the numerous beautiful galls occurring on many plants throughout the year. Most of the common species have been found, and a few of the makers have been bred, including *Perrisia strobi* Winn., which was bred for the first time in England from a spruce cone picked up in Bagley Wood: this emerged 21st April, 1915. *Diplosis fraxinella* Meade, the inquiline of the mite *Eriophyes fraxini* Karp., the cause of the curious 'Cauliflower' gall of the Common Ash., which is plentiful on one tree

near Barton. *Rhabdophagus pseudo-coccus* has been bred from small galls on Willow leaves found at Cothill by E. G. R. Waters. A new British species, *Clinodiplosis nidorum* Kieff., has been bred by the writer from an old birds'-nest from Oxford, in 1925.

MYCETOPHILIDAE

The fungus-gnats of the district have been to some extent neglected by the writer, only about 150 species having been collected. Of these, 81 species were taken on the windows in the corridors of the University Museum, a number which will be considerably augmented when the *Sciaras* have been worked out. A few new forms were recently described by Mr. F. W. Edwards, in a most valuable revision of the group, published in the *Transactions of the Entomological Society of London*, 1925. Only a few of the more interesting species are therefore given here. *Symmerus annulatus* Mg., Shotover Hill. *Bolitophila spiniger* Edw., Museum window. *Macrocera vittata* Mg., Shotover and Hogley Bog; *M. fasciata* Mg. and *M. centralis* Mg., Museum windows; *M. stigmoides* Edw., Shotover and Bagley Wood. *Asindulum nigrum* Latr., one example on the footpath, Longwall Street, Oxford, hitherto only recorded from Mildenhall, Suffolk. *Apemon marginata* Mg., Bagley Wood. *Platypura ruficornis* Zett., one female, Hogley Bog; *P. nigricornis* F., one female in the High Street, Oxford. *Zygoneura sciarina* Mg., two examples on Museum windows. *Sciara hispida* Winn. and *S. glabra* Mg., bred from old birds'-nests found in the University Parks. *Mycomyia digitifera* Edw., described from a male captured by the writer in Bagley Wood, May 1916, the only example known. *Leptomorphus walkeri* Curt., this scarce and showy species has also occurred in the Museum windows. *Coclosia flava* Staeg., a male of this rare species was taken in Headington Wick

Copse, June 1914; *C. silvatica* Landr., the only British male known of this species was captured in the Museum, February 1925. *Boletina pallidula* Edw., a female, Bagley Wood, May 1916 (there is only one other example known). *Leia winthemi* Lehm., an apparently rare species, one male in Museum and one from Headington Hill. *Docosia fumosa* Edw.; the larva of this new species has been found by the writer in old birds'-nests, in the University Parks and elsewhere in the District, and both sexes bred. The only known British example of *Ecechia pallida* Stan. was taken in Oxford. The following are some of the more interesting species which have been taken on the Museum windows: *E. bicincta* Staeg., *E. exigua* Lundst., *E. contaminata* Winn., *E. nigroscutellata* Landr., *E. hammi* Edw., *E. crucigera* Lundst., *E. pollicata* Edw., *Rhymosia connexa* Winn., *R. britteni* Edw., *R. spinipes* Winn., *R. bifida* Edw., *Allodia fissicauda* Lundst., *A. auriculata* Edw., *A. sericoma* Mg., *Cordyla fissa* Edw., *C. pusilla* Edw., *Phronia triangularis* Winn., *P. vitiosa* Winn., *Mycetophila ocellus* Walk., *M. signatoides* Dz., *M. guttata* Dz., *Zygomyia notata* Stan. Open Brasenose Common has produced, amongst others, *Mycetophila curviseta* Lundst., *M. stolidu* Walk., *Sceptonia concolor* Winn., *Epicypta testata* Edw., and *E. punctum* Stan. The two latter were beaten from furze, December 1916.

BIBIONIDAE

The genus *Scatopse* is fairly well represented; *S. flavicollis* Mg., *S. inermis* Ruthé, *S. recurva* Lw., *S. brevicornis* Mg. and *S. halterata* Mg., with other species, have occurred in and around the City, while *S. transversalis* Lw. is fairly common at Cothill, with the black ant *Lasius* (*Acanthomyops*) *fuliginosus* Latr. The flies of the genus *Dilophus* and *Bibio* are among the most abundant insects met with

in spring and early summer. *Bibio pomonae* F. and *B. lepidus* Lw. are two of the better species obtained in the District, the former in summer and the latter in late autumn.

SIMULIDAE

Some species of this family are among the most troublesome of 'biting' flies, the females attacking man, beast and birds. Nine species occur more or less plentifully, the least common being *Simulium morsitans* Edw.; and the more recently-described *S. nölleri* Friedr., *S. equinum* L., with its two broods, is the most abundant and most persistent 'biter.'

CHIRONOMIDAE

Gnats and Midges. A large number of species, many of which still await determination, have been collected in the District. The many small streams and patches of marshy ground around Oxford are specially favourable as breeding haunts of this numerous family, of which the following are only a few examples:

Corynoneura majuscula Edw., *C. vittata* Edw., and *C. coronata* Edw.; these three exceedingly small species were described by Mr. F. W. Edwards in 1924, and captured by the writer, April 1916, in 'Mesopotamia,' near the University Parks, Oxford. *Chironomus malacus* Walk., the Parks: the first capture known since F. Walker described it in 1856; *C. nigroviridis* Mcq., and *C. venustus* Staeg., both from Shotover and Hogley Bog; *C. histrio* F., near Bayswater Mill; *C. rufipes* L. and *C. annularis* Deg., both from Magdalen Bridge. *Cricotopus unifasciatus* Mcq., Hogley Bog; *C. tibialis* Mg. and *C. sylvestris* F., Shotover Hill. *Orthocladius incoactus* Walk., the Parks; *O. obtexens* Walk., Shotover and Hogley Bog; *O. oblidens* Walk., King's Mill; and *O. novatus* Walk., Southfield Road. *Trichocladius*

annulipes L., in Museum window. *Tanytarsus pusio* Mg., *T. flavipes* Mg., *T. gmundensis* Egg., *T. sylvaticus* v. d. Wulp, all from the University Parks. *Metrioctenemus adjunctus* Walk., Hogley Bog; *M. incomptus* Zett., 'Mud Lane,' near Cowley. *Diamesa obscurimannus* Mg., the Parks. *Tanyptus punctipennis* Mg., Open Brasenose Common; *T. melanurus* Mg., Hogley Bog; *T. nervosus* Mg., Bayswater Mill; *T. nugax* Walk., 'Mud Lane.' The above are some of the least-known species that have occurred to the writer.

The *Ceratopogoninae* are among the most annoying 'blood-suckers' known; although very small, they make up in numbers what they lack in bulk, the after-effects of their 'bites' often causing considerable pain and irritation. Mr. F. W. Edwards has during the last few years made many observations upon the habits of certain species of this family, and has shown that many of them are truly predaceous in that they prey upon other insects. A species has recently been discovered that sucks the blood of moths when at rest on tree-trunks. Over forty species are known from the District, among which are the following:

Forcipomyia picea Winn., *F. kultenbachii* Winn., both bred from larvae found under Oak and Elm bark; *F. radicola* Edw., bred from larvae found in *Angelica* roots, *F. bipunctata* L., *F. ciliata* Winn., *F. brevipennis* Mcq. and *F. murina* Winn. all occur more or less abundantly in the Museum windows. *Atrichopogon rostratus* Winn., Bayswater Mill; *A. minutus* Winn., Shotover Hill. *Kempia pavidus* Winn., Museum windows; *K. appendiculata* Goetg., Shotover Hill. *Dasyhelea versicolor* Winn., bred from small tank in Museum Grounds. *Psilohelea candidata* Winn., Museum windows. *Culicoides amoenus* Winn., Museum windows; *C. pictipennis* Staeg., bred from pupa found in small pond on Shotover Hill; *C. nubeculosus* Mg., Headington Hill; *C. guttularis* Kieffer, Open Brasenose Common; *C. obsoletus*

Mg., *C. pulicarius* L., *C. vexans* Staeg.: these three species are extremely abundant, and the worst offenders in regard to their 'blood-sucking' habits; *C. cunctans* Winn., though less common, is also a 'biter.' *Stilobezzia gracilis* Hal., from various localities; *Serromyia femorata* F. is abundant and one of the predaceous species. *Palpomyia flavipes* Mg., *P. spinipes* Mg., and *P. serripes* Mg., all from Hogley Bog; *P. brachialis* Hal., Headington Wick Copse. *Sphaeromyia nitida* Meq., 'Mesopotamia'; in this species the female oviposits in the form of a ribbon whilst hovering over the water. *Schizobelia leucopeza* Mg. is found in great profusion on Umbelliferous flowers. *Monohela illustris* Winn. was the prey of an Empid, *Tachydromia annulipes* Mg. female. *Dicrobezzia venustus* Mg., *Bezzia annulipes* Mg., *B. ornatus* Mg., in Museum windows; *B. solstitialis* Winn., Headington Hill; *B. flavipalpis* Winn., Shotover Hill, 'biting.'

PSYCHODIDAE

These pretty moth-like flies are common in most damp spots throughout the District, whence there are records of thirty-one species. *Pericoma cognata* Eat., *P. blandula* Eat., *P. pulchra* Eat., in the clay-pits, Shotover Hill; *P. compta* Eat., *P. advena* Eat., from the University Parks; *P. palustris* Mg., *P. ustulata* Hal., Bayswater Mill; *P. pilularia* Eat. MS., *P. morula* Eat., Headington; *P. rothschildi* Eat., *P. gracilis* Eat., Open Brasenose Common. *Ulomyia fuliginosa* Mg. is common. *Psychoda phalaenoides* L. is abundant everywhere, especially in windows; *P. sexpunctata* Curt. and *P. erminea* Eat. in the Museum windows.

CULICIDAE

Of the three species of true 'mosquitoes,' *Anopheles bifurcatus* L. is abundant everywhere and breeds in any

small pool or ditch : *A. maculipennis* Mg. is also common, and enters houses freely ; *A. plumbeus* Steph. is not uncommon but local. All three are very vicious 'biters,' and are also well known as 'carriers' of the malaria infection. *Aëdes cinereus* Mg., Shotover Hill, 'biting.' *Ochlerotatus vexans* Mg., not uncommon in the clay-pits, Shotover Hill, 'biting' ; *O. maculatus* Mg., Shotover Hill and Bagley Wood, 'biting' ; *O. diversus* Theob. is common and a bad 'biter.' *Finlaya geniculatus* Ol., University Parks, 'biting.' *Taeniorhynchus richiardii* Fic., Shotover clay-pit, 'biting.' *Theobaldia annulatus* Schrk., common everywhere and in houses, 'bites' viciously. *Culicella fumipennis* Steph., Shotover Hill ; *C. morsitans* Theob., bred from pupa found in small pond, Shotover Hill. *Culex pipiens* L., the commonest species and abundant in houses nearly all the year round. No case of its 'biting' has come under the writer's notice.

Chaoborus crystallinus Dg., common everywhere, larvae plentiful in Museum tank. *Dixa aestivalis* Mg. and *D. autumnalis* (Mg.) Goet., both bred from pupae found in water near Bayswater Mill ; *D. maculata* Mg. is common ; *D. laeta* (Mg.) Goet., Bayswater Mill ; *D. submaculata* Edw., not uncommon in various localities ; *D. nebulosa* Mg., Bayswater Mill and Open Brasenose Common.

PTYCHOPTERIDAE

All five species of this family occur commonly, with the exception of *Ptychoptera scutellaris* Mg., which has been taken at Yarnton (J. Collins) and by myself near Bayswater Mill.

LIMNOBIIDAE

The Crane-flies. An extensive family of long-legged flies, many of which occur everywhere, especially in damp

situations and in woods. The males of many species 'dance' in large or small swarms towards dusk to attract the females. Common species are omitted.

Dicranomyia lucida Meij. was first recognised as British from specimens captured in Hogley Bog, Aug. 1915, and has since been taken near Bayswater Mill, flying in a small swarm in late afternoon; *D. didyma* Mg., in the University Parks, in a small swarm towards evening; *D. modesta* Mg., Shotover Hill; *D. sericata* Mg., Open Brasenose Common and Bayswater Mill; five other species are more or less abundant. *Rhipidia maculata* Mg., common and generally distributed. *Limnobia bifasciata* Schrk. and *L. quadrinotata* Mg., Bayswater Mill, the latter also from Bagley Wood; *L. analis* Mg. and *L. nigropunctata* Schum., both from Lye Hill and Bayswater Mill; *L. masoni* Edw., a pair, Shotover, June 1907; *L. stigma* Mg. and *L. macrostigma* Schum., Shotover and Bayswater Mill. *Thaumastoptera calceata* Mik., Hogley Bog. *Goniomyia tenella* Mg. is generally distributed and common; *G. abbreviata* Lw., this rare and local species was captured near Bayswater Mill. *Chilotrichia imbuta* Mg. also from the same locality. *Empeda flava* Schum. and *E. nubila* Schum. are both fairly common. *Ilisia areolata* Siebke, Hogley Bog and Shotover Hill. *Erioptera trivialis* Mg. and *E. flavescens* Mg., not uncommon; *E. fuscipennis* Mg., Bayswater Mill; *E. griseipennis* (Mg.) Meij., Yarnton (J. Collins), Lye Hill and Shotover. Seven species of *Molophilus* are common, whilst *M. flavus* Goet. was captured on Shotover Hill, June 1917. *Rhypholophus haemorrhoidalis* Ztt. and *R. varius* Mg., Headington Hill and Bayswater Mill. *Ormosia* ? *bicornis* Meij.; a female which may possibly be this species was captured on Open Brasenose Common, September 1915; several other common species also occur. *Symplectomorpha stictica* Mg., frequent on wet sand, Hogley Bog and Shotover. A male

of *Trimicra pilipes* F. was taken by sweeping at Wood Eaton (J. Collins). *Idioptera marmorata* Mg. is not uncommon in boggy localities. Six species of *Limnophila* are fairly common and generally distributed, and *L. filata* Wlk. may be found near Bayswater Mill. *Pilaria discicollis* Mg., Shotover and Bayswater Mill. *Pseudolimnophila lucorum* Mg., 'Mesopotamia,' University Parks; *P. sepium* Verr., Shotover Hill. *Poecilostola punctata* Schrk., from Hogley Bog. *Epiphragma picta* F., Bagley Wood. *Dicranota bimaculata* Schum., Hogley Bog and Bayswater Mill. The common *Trichyphona immaculata* Mg. is found in all damp situations, and the large and handsome *Pedicia rivosa* L. is sometimes common in Hogley Bog and similar localities throughout the district. *Cylindrotoma distinctissima* Mg. has occurred near Bayswater Mill and in Bagley Wood, and *Phalacrocer a replicata* L. has been found in Tubney Wood. Four species of 'Winter-gnats' are always common from autumn to spring. The first British example of *Trichocera major* Edw. was obtained on Shotover Hill, September 1914; *T. parva* Mcq. is occasionally met with. Of the eight species of *Pachyrrhina* occurring here, mention need only be made of *P. cornicina* L., *P. guestfalica* Westh., and *P. analis* Schum.; all these are but seldom met with. Some thirty species of *Tipula* have been found within the limits of the District, many species being very plentiful, and a few, apparently rare or overlooked, include *T. truncorum* Mg., a pair from Open Brasenose Common; *T. hortulana* Mg., Shotover; *T. obsoleta* Mg., Headington Hill; *T. vittata* Mg., on wall, outside the University Museum; *T. selene* Mg., Bagley Wood; *T. fascipennis* Mg., Shotover Hill; *T. pabulina* Mg., Hogley Bog and Tubney Wood (J. Collins); *T. cava* Riedel, Shotover and Bagley Wood; *T. peliostigma* Schum., several times at light in the house, Southfield Road: it was also bred from an old thrush's

nest from Shotover; the largest British Dipteron, *T. gigantea* Schrk. is fairly common and comes to light; *T. lutescens* F., which rivals the last-mentioned in size, was obtained in some numbers near 'Joe Pullen's' tree (before that well-known landmark was burnt down), and one came to light last year in the writer's house. *Dictenidia bimaculata* L. was bred from rotten wood, June 1923, by Mr. H. F. Barnes, from Bagley Wood. *Ctenophora pectinicornis* L., one specimen on a fence, Iffley Road.

RHYPHIDAE

Rhyphus fenestralis Scop. and *R. punctatus* F. are both very common, and are often found in windows in houses. The males fly in small swarms towards evening.

BRACHYCERA

STRATIOMYIDAE

A family of varied habits, though mostly found in marshy places. Thirty-two species are now known from the District. *Pachygaster atra* Pz. and *P. leachii* Curt., both generally distributed. *Oxycera pulchella* Mg. is common in Hogley Bog and at Cothill, often found settled on Alder leaves. *Nemotelus pantherinus* L., Hogley Bog, and *N. uliginosus* L., Wytham (J. Collins), are both scarce. *Oxycera pygmaea* Fln., Hogley Bog. *Stratiomys chamaeleon* L. was formerly fairly common in Hogley Bog, but has not been seen there for some years; *S. potamida* Mg., rare, Shotover and Tubney, and a specimen was taken by Commander Walker near the University Museum, July 1918; *S. furcata* F., once only on Shotover Hill. *Odonotomyia argentata* F.; this scarce and local species, which had not been observed in England for some years, was

captured for the first time by the writer in 1918, and has occurred several times since, in early spring; the males fly to and fro in the hot sunshine. *O. tigrina* F., Tubney (W. Holland). *Sargus bipunctatus* Scop., a male outside the University Museum; two females Headington Hill (H. Britten); *S. flavipes* Mg., Shotover; *S. nitidus* Verr., University Parks; *S. minimus* Ztt., Lye Hill. *Microchrysa cyaneiventris* Ztt., Shotover (G. H. Verrall), Bayswater Mill. *Beris fuscipes* Mg., King's Weir (W. Holland), Shotover. *Chorisops tibialis* Mg. is not uncommon; one specimen has occurred in Museum window.

TABANIDAE

Horse-flies, or 'Stouts' as they are called by the country folk, are among the most vicious of 'blood-suckers,' and many are only too common. *Haematopota crassicornis* Whlbg. is not rare. *Therioplectes micans* Mg., a male on Shotover Hill, c. 1898, and another on the pavement outside Pembroke College, May 1921 (T. Barnard). *Atylotus fulvus* Mg., Tubney Wood. The fine and handsome *Tabanus sudeticus* Zlr. was captured in the garden of Somerville College, July 1896, by Prof. E. B. Poulton. *T. autumnalis* L., on Magdalen Bridge; *T. maculicornis* Ztt., Hogley Bog. *Chrysops quadrata* Mg., Tubney Wood (J. Collins); *C. relictus* Mg., King's Weir (W. Holland).

LEPTIDAE

Leptis scolopacea L., *L. tringaria* L., *L. nigriventris* Lw. and *L. lineola* F. are all common and fond of sitting on tree-trunks head-downwards. *Chrysophilus aureus* Mg. and *C. auratus* F. are abundant in damp situations.

ASILIDAE

‘Robber-flies.’ An entirely predaceous family which prey exclusively upon other insects. *Leptogaster cylindrica* Deg. is common; *L. guttiventris* Ztt., Tubney Wood, once only. *Dioctria oelandica* L., Tubney Wood and Stanton St. John (J. Collins); *D. atricapilla* Mg., generally distributed, sometimes abundant in the University Parks. in long grass; *D. rufipes* Deg. is common; *D. baumhaueri* Mg., not very common; *D. linearis* F., Wood Eaton (J. Collins). *Laphria marginata* L., Tubney Wood (G. H. Verrall); near Stanton St. John, fairly common. The large and handsome *Asilus crabroniformis* L. is decidedly scarce; only odd specimens being met with at rare intervals at Shotover Hill, Boar’s Hill and Tubney. *Epitriptus cingulatus* F. is not common, occurring occasionally in the University Parks. *Neoitamus cyanurus* Lw., a woodland species, not rare in Tubney Wood. *Itornus cothurnathus* Mg. was an addition to the British List when first captured by Mr. W. Holland at Stow Wood, Oxon, June 1895, and Tubney Wood, Berks, June 1901; it has only been taken on a few occasions since at the latter locality. *Machimus atricapillus* Fln., Bagley and Tubney Woods. *Dysmachus trigonus* Mg. is generally distributed and common.

BOMBYLIDAE

‘Humming-bird flies.’ These beautiful hairy insects are frequently seen in gardens and woods hovering over flowers, especially primroses and *Polyanthus*. *Bombylius discolor* Mik. and *B. major* L. are both common.

THEREVIDAE

Thereva nobilitata F., *T. plebeia* L. and *T. bipunctata* Mg. are all equally common; *T. circumscripta* Lw. has only been taken once in Tubney Wood.

SCENOPINIDAE

‘Carpet-flies.’ More often met with in houses than in the open. *Scenopinus fenestralis* L. is sometimes quite common in the windows of the University Museum. It has been twice taken in Hogley Bog.

CYRTIDAE

‘Bladder-flies.’ *Oncodes gibbosus* L. is never common, but occurs all over the District; *O. pallipes* Latr. is rare, one specimen in a spider’s web, Hogley Bog; Wytham on several occasions (Commander Walker). *Acrocera globulus* Pz., chiefly from the Tubney district; also near Stanton St. John, not common.

EMPIDAE

This family is of great bionomic interest on account of the unusual diversity of habits, both before and during courtship, in the various genera and species. Since Mr. Milburn Hewlett’s discovery that the male of *Empis borealis* L. provided the prey (previous to courtship) for the female during copulation, the writer has made extensive observations, in and around Oxford, for many years past, and has shown that the same habit is common to many species of the genus *Rhamphomyia* and some members of the genus *Empis*. It is by no means general throughout the *Empidae*; many genera and species are purely predaceous, both sexes taking prey which has no part in subsequent courtship. Then, again, there are species which never take prey, and whose courtship is quite normal; and in one species the taking of prey is confined to the female only, either before, or after courtship, which is quite an elaborate affair.

About 160 species of *Empidae* have been captured in and around Oxford, of which quite a large number still bear

only MS. names. These for obvious reasons are omitted, as well as all common species. *Hybos grossipes* L. was found in great abundance in Bagley Wood, June 1918; it had only been previously recorded from Scotland, two examples were in the act of sucking a small Tineid moth; *H. femoratus* Müll, both males and females prey chiefly on small Ichneumonids and Braconids; in *H. culiciformis* F. the prey is usually small Diptera. Several species of *Cyrtoma* are fairly common; one *C. simplicipes* Ztt. female was captured, holding a Chironomid fly as large as herself. Many interesting species of *Rhamphomyia* are to be found; *R. longipes* Mg. is plentiful in buttercup flowers, *R. dentipes* Ztt., *R. hybotina* Ztt., Bagley Wood; *R. conformis* Kow. and *R. tarsata* Mg., Shotover; *R. tibiella* Ztt., Cowley Marsh; *R. anomalipennis* Ztt., Open Brasenose Common; *R. atra* Mg., Bayswater Mill; *R. gibba* Fln. in Museum window; *R. spinipes* Fln., Tubney (J. Collins). *Empis opaca* F. and *E. scutellata* Curt., usually considered scarce insects, are sometimes abundant in many localities close to the City; *E. concolor* Verr., Shotover; *E. lucida* Ztt., Bayswater Mill; *E. lamellicornis* Beck., near Shotover and Bagley Wood. The habits of the thirty species of *Hilara* which have been taken in or adjacent to the City, usually near or over water, are very interesting, in that the male skims over the surface of the pond or stream and picks up some insect or object floating on the surface, which is then enveloped in silken threads, in the form of a ball, and in some cases this silken casket is of a very complex and beautiful structure. This in pairing is passed to the female, and is carried by her during the whole period of copulation, which takes place entirely on the wing, both male and female assisting in flight. Some species have decided preference for the insects which are captured from off the water, but the common and versatile *H. maura* F. will pick up anything

and everything floating down the stream that it can lift. This the writer has proved repeatedly by actual experiment. *Trichina claripes* Mg., *T. flavipes* Mg. and *T. elongata* Hal. are all represented. *Microphorus velutinus* Mcq., Bayswater Mill. *Oedulea flavipes* Ztt., Shotover, and *O. holmgreni* Ztt., Headington. *Leptozeu flavipes* Mg. and *Clinocera bipunctata* Hal., Hogley Bog. *Heleodromia stagnalis* Hal., *Hemerodromia precatória* Fln. and *H. raptoria* Mg. have been captured by sweeping water plants in 'Mesopotamia,' University Parks. On the side of the clay-pit on Shotover Hill *Ardoptera irrorata* Fln., *A. guttata* Hal. and *A. ocellata* A. Costa are not uncommon. *Gloma fuseipennis* Mg.; the males fly in swarms towards evening; Bayswater Mill and Bagley Wood. *Trichopeza longicornis* Mg., Bagley Wood. *Chelipoda vocatoria* Fln., near Shotover. *Seiodromia immaeulata* Hal., in sand-pit, Shotover Hill. *Drapetis humilis* Frey. is common under stale horse-droppings, Lye Hill. *Tachypeza fuseipennis* Fln., on tree-trunk, Bayswater Mill. *Elaphropeza ephippiata* Fln. is not rare by sweeping low herbage on Shotover Hill. *Tachydromia* is represented by forty-four species; these include many interesting species. *Symballophthalmus dissimilis* Fln., Bayswater Mill and Bagley Wood.

DOLICHOPODIDAE

These flies are more abundant in the neighbourhood of small streams, ditches and boggy ground than elsewhere. These have not received the same attention as the preceding family, consequently the records are more meagre. *Psilopus platypterus* F., common on tree-trunks, Headington Wick Copse; *P. wiedemanni* Fln. and *P. lowei* Beck. from Hogley Bog. *Eutarsus aulicus* Mg., near Iffley Lock. *Neurigona suturalis* Fln., Tubney; *N. quadrifasciata* F., Headington Wick. Many common species of the genus

Dolichopus are plentiful everywhere. *Hercostomus græilis* Stan., Tubney; *H. nanus* Meq., University Parks. *Hypophyllus obscurellus* Fln., near Shotover. *Chrysotus fenoratus* Zett., Hogley Bog. *Diaphorus oculatus* Fln., Marston Copse. The beautiful silvery species of *Argyra* are not uncommon on the muddy margins of streams. *Leucostola vestita* W. and *Syntormon denticulatus* Ztt., Hogley Bog. *Xiphandrium appendiculatum* Ztt., Stanton St. Jchn. Several species of *Medeterus* are abundant on tree-trunks and walls everywhere. *Scellus notatus* F., Banbury Road (J. Collins), Shotover. *Hydrophorus litoreus* Fln., pond on Brasenose Common.

LONCHOPTERIDAE

Lonchoptera lutea Pz., *L. furcata* Fln. and *L. tristis* Mg. are all fairly common, but very variable in colouring and markings.

PLATYPEZIDAE

A very small family of mostly velvety-black flies, some of which have been bred from fungus. *Opetia nigra* Mg., Headington Wick. *Platynema pulicaria* Fln. is generally distributed and sometimes locally common. *Callimigia speciosa* Mg., Bayswater Mill; *C. amoena* Mg., Bagley Wood. *Agathomyia antennata* Ztt., Shotover Hill. *Platypeza furcata* Fln., Bagley Wood; *P. dorsalis* Mg. and *P. picta* Mg. have both occurred in the Museum windows.

PIPUNCULIDAE

These are mostly parasitic on various species of Homopterous insects. *Chalarus spurius* Fln. is not uncommon. *Verrallia pilosa* Ztt. and var. *setosa* Verr., Shotover and Bagley Wood; *V. aucta* Fln., Shotover. Twenty-two species of *Pipunculus* occur, the more interesting of which are *P. zonatus* Ztt., *P. terminalis* Thoms., Shotover and

Bagley Wood; *P. unicolor* Ztt., Museum Grounds; *P. fascipes* Ztt., *P. seminitidus* Beck., *P. haemorrhoidalis* Ztt., and *P. semimaculatus* Beck., from near Bayswater Mill; *P. varipes* Mg. and *P. xanthopus* Thoms., Hogley Bog; *P. vittipes* Ztt. near Stanton St. John, and *P. flavipes* Mg., Tubney (J. Collins); *P. strobli* Verr., Hogley Bog; *P. pratorum* Fln. and *P. strigulipes* Verr., Shotover Hill.

SYRPHIDAE

This family contains some of the most strikingly-coloured flies we possess, and many bear a close superficial resemblance to Hymenoptera, such as Wasps, Bees, Humble-bees and Sawflies. About 140 species are known from this District, many of which are fairly common. Mention may be made of *Paragus bicolor* F., Yarnton (J. Collins). *Pipizella maculipennis* Mg., Shotover; *P. flavitarsis* Mg., Lye Hill; *P. heringi* Ztt., near Islip. *Pipiza luteitarsis* Ztt., Lye Hill; *P. bimaculata* Mg. and *P. notata* Mg., Shotover Hill; *P. lugubris* F., Boar's Hill. *Chilosia praecox* Ztt., Hogley Bog; *C. impressa* Lw., Shotover and Hogley Bog; *C. proxima* Ztt., *C. intonsa* Lw. and *C. vulpina* Mg., Shotover; *C. honesta* Rnd., Shotover and Boar's Hill; *C. velutina* Lw., Shotover and Tubney Wood. *Melangyna quadrimaculata* Verr., not uncommon at sallow in Bagley Wood (O. W. Richards), Tubney (J. Collins), University Parks. *Syrphus tricinctus* Fln., University Parks and Bagley Wood; *S. latifasciatus* Meq., Bagley Wood; *S. cinctus* Fln. and *S. labiatarum* Verr., Shotover Hill; *S. lasiophthalmus* Ztt., Boar's Hill. *Xanthogramma citrofasciatum* Deg., Shotover. *Sphegina clunipes* Fln., Bayswater Mill. *Brachyopa bicolor* Fln., not uncommon in Bagley Wood on exuding sap (O. W. Richards); near Stanton St. John (J. Collins). *Volucella inanis* L., once only, Shotover Hill; *V. inflata* F., Bagley and Tubney Woods. *Eristalis sepulchralis* L.

occurs sparingly throughout the District, the writer once found it in some numbers on wet mud at the margin of a pond on Shotover Hill; *E. nemorum* L., Hogley Bog. *Helophilus trivittatus* F., Shotover and Tubney Wood; *H. hybridus* Lw., not uncommon at rare intervals in Hogley Bog; *H. versicolor* F., Boar's Hill; *H. transfugus* L., King's Weir. *Tropidia scita* Harr. is not uncommon in Hogley Bog and at Cothill. None of the beautiful humble-bee-like species of *Criorrhina* are common, but all the five British forms occur, *C. oxyacanthae* Mg. being the one most frequently met with. *Xylota lenta* Mg., Frilford Heath (J. Arkle). *Eumerus strigatus* Fln., Shotover and University Parks; *E. tuberculatus* Rnd. has been taken occasionally in the writer's garden at Southfield Road. *Chrys-ochlamys cuprea* Scop. and *C. ruficornis* F. have both been bred from larvae found in exuding sap from a 'Cossus-tree' in Hogley Bog. *Sericomyia borealis* Fln. is very uncommon, Shotover and Boar's Hill; *S. lappona* L. was once captured by Prof. Poulton at 'Youlbury,' Boar's Hill. *Microdon devius* L.; this rare species has been taken several times at Cothill by Messrs. J. Collins and H. Donisthorpe.

CONOPIDAE

Conops quadrifasciata L., *C. ceriiformis* Deg. and *C. flavipes* L. are not uncommon throughout the District. A fine addition to the British List in *C. (Brachyglossum) signatus* Wied. was made by the capture of a pair at Tubney, September 1910, by Mr. J. Collins; it has not been taken since. With two exceptions, all the other species of this family are to be met with more or less commonly in the district.

OESTRIDAE.

The bot-fly, *Gastrophilus equi* F., is only too common; *G. nasalis* L. and *G. haemorrhoidalis* L. have been bred from

pupae found in horse-droppings, but both are rare. *Hypoderma lineatum* Vill., the Ox Warble-fly, is very scarce, but evidence of the presence of its larvae is only too apparent. *Oestrus ovis* L. is also rare; one was found on the wall of a barn at Beckley.

TACHINIDAE

These are parasitic flies, breeding chiefly in the larvae of various species of Lepidoptera, a few on Coleoptera, Orthoptera, Forficulidae and Hymenoptera-Aculeata, etc., whilst others are flesh-flies breeding in carrion, etc. 130 species are known from the District. A few only of more than usual interest are enumerated. *Meriania puparum* F., once only, Shotover Hill. *Masicera sylvatica* Fln., Shotover. *Exorista glauca* Mg., Tubney. *Phryno vetula* Mg., Prattle Wood (J. Collins). *Tricholyga sorbillans* Wied.; four of this large species was bred from a single larva of *Saturnia pavonia* found near Watlington. *Macquartia chalconota* Mg. has been bred several times from larvae of *Chrysomela varians* Schall. *Degeeria muscaria* Fln. is not uncommon in Tubney Wood, where it was first taken by the late G. H. Verrall. *Ernestia truncata* Ztt. and *E. conjugata* Ztt., both from Hen Wood. *Carcelia bombylans* R.D., bred from a larva of *Dasychira pudibunda* picked up in Warneford Lane; *C. gnava* B.B., bred from *Bombyx neustria* larvae. *Wagneria latifrons* Ztt., Wytham and Tubney (J. Collins). *Alophora obesa* F., Shotover. *Actia reducta* Villen., in the Museum windows. *Dinera grisea* Fln., Tubney Wood. *Sarcophaga affinis* Fln., the first authentic specimens of this species taken in England were captured in the writer's garden, Southfield Road, where also occurred *S. agnata* Rnd., a male and female being bred from the garden snail *Helix aspersa* L.; and from the University Parks *S. roesellei* Böttch. was obtained. Many other species of interest have

been added during the last two seasons by Mr. J. Collins, who has given special attention to this group, so that twenty-two species are now known from the District. *Engizops micronyx* B.B. from Yarnton (J. Collins); *E. pecchiolii* Rnd., Hogley Bog and Headington. *Milto-gramma germari* Mg., Lye Hill and Tubney. *Ptychoneura cylindrica* Mg., Tubney (J. Collins). *Metopia campestris* Fln., Tubney. *Setulia grisea* Mg., Lye Hill and Tubney Wood.

MUSCIDAE

These call for no special comment, as nearly all the species are more or less common everywhere.

ANTHOMYIDAE

Many species in this group are still uncertain in their identification, and mention is only made of a few species of general interest. *Dexiopsis lacteipennis* Ztt., Tubney (J. E. Collin). *Hylemyia praepotens* Wied., Shotover. The fine *Eustalomyia festiva* Ztt. was bred from the burrows of and in company with the Fossor *Blepharipus* (Crabro) *leucostomus* L., from an old log near Cowley. *Lasiops meadii* Kow. can be bred in abundance from various old birds'-nests. *Lasiomma eriophthalma*, *Anthomyia pluvialis* L. and *A. procellaris* Rnd. are also not uncommon from the same source. *Hammomyia albescens* Ztt. and *H. sociata* Mg. are found about the burrows of bees (*Andrena*, etc.) which nidificate in the ground, and upon which they are parasitic, at Tubney and elsewhere. *Hylephila personata* Collin was captured following the bee *Andrena labialis* K. at Boar's Hill and near Cowley, and with *A. nigroaenea* K. in the Museum Grounds; it is also parasitic. *H. sponsa* Mg., Shotover. *Pegomyia hyoscyami* Pz., the Mangold and Beet-fly, has been bred from *Atriplex*, *Chenopodium* and

Hyoscyamus : *P. bicolor* Wied. and *P. nigritarsis* Ztt. from both Dock and Sorrel. and *P. dulcamarae* Wood in some numbers from blotched leaves of the Woody Nightshade (*Solanum Dulcamara* L.)—the latter had not been bred since it was first discovered by Dr. Wood in Herefordshire : all these were found in the Museum Grounds. *Chirosia parvicornis* Ztt. was bred from larvae feeding in the stem of the Bracken (*Pteris aquilina* L.) from Shotover. *Myopina reflexa* Dsv., by sweeping, near Shotover Hill.

CORDYLURIDAE AND HELOMYZIDAE

Beyond the usual common species, very few of outstanding interest have been captured in these two families. *Cnemopogon apicalis* Mg. and *Leptopa filiformis* Ztt. from near Bayswater Mill. *Amaurosoma flavipes* Fln., *A. fasciata* Mg., *A. tibiella* Ztt., *A. brevifrons* Ztt., *A. armillata* Ztt. and *Trichopalpus fraternus* Mg. have all occurred in Hogley Bog. *Coniosternum obscurum* Fln., by the river at Kennington. *Helomyza variegata* Lw., *H. affinis* Mg., *Oecothea fenestralis* Fln., *Leria serrata* L. and *Tephrochlamys rufiventris* Mg. are not uncommon in the windows of the University Museum ; *T. flavipes* Ztt. has been bred from old blackbirds' and thrushes' nests from the University Parks. *Allophyla atricornis* Lw., Shotover Hill. The moles'-nest fly, *Eccoptomera microps* Mg., can always be found in or bred from the nests of that interesting animal : *E. ornata* Lw., which may also be attached to a mammal's nest, was obtained on Shotover Hill.

HETERONEURIDAE

Heteroneura albimana Mg. was once found in some numbers on the rail of the bridge at the entrance to 'Mesopotamia,' University Parks.

DRYOMYZIDAE

Dryomyza flaveola F. is not rare, but its scarce winter form, var. *zetterstedtii*, has been taken in and around the University Museum in November on three occasions. *Neuroctena anilis* Fln. is not uncommon. The beautiful *Neottiophilum praeustum* Mg. has been bred in numbers from various old birds'-nests from the University Parks and elsewhere.

SCIOMYZIDAE

Some thirty species of this family have been found in various parts of the District, of which the less common are *Phaeomyia fuscipennis* Mg., South Parks, Headington Hill. *Tetanocera robusta* Lw., Tubney Wood. *Sepedon sphegeus* F., Hogley Bog and Boar's Hill; *S. spinipes* Scop. is not rare at Yarnton (J. Collins). *Dichrochira glabricula* Mg., University Parks and Hogley Bog; *D. nigrimana* Mg., near Bayswater Mill.

PSILIDAE

The 'Carrot-fly,' *Psila rosae* F., is not a common insect; it has, however, been bred from carrots. Other species of the genus are well represented in the District. *Psilosoma lefebvreii* Ztt., at irregular intervals in Hogley Bog. *Loxocera fulviventris* Mg., from Bagley Wood. *Chyliza atriseta* Mg., Lye Hill and Shotover; *C. annulipes* Mcq., Tubney Wood (J. Collins). *Calobata ephippium* F., Yarnton (J. Collins), Hogley Bog and Bayswater Mill.

ORTALIDAE

Dorycera graminum F., very variable in size, is not uncommon. *Ptilonota guttata* Mg. can always be relied upon from Bagley Wood in May.* Most of the common species of *Herina* are to be found in most damp localities.

Platystoma seminationis F., *Rivellia syngenesiae* F., *Scoptera vibrans* L., *Ulidia erythropthalma* Mg. and *Chrysomya demandata* F. are all of general distribution, but never abundant.

TRYPETIDAE

These are rather small flies, many of which have very beautiful wing-markings. They are all attached to special plants upon which their larvae feed either as leaf-miners, gall-makers, and in many cases in the seed-heads of their respective host-plants. Thirty-two species have so far been found here. The larvae of *Acidia cognata* Wied. is not uncommon in the autumn mining in the leaves of Colts-foot (*Tussilago Farfara* L.). *A. heraclei* L., the common Parsnip and Celery fly, is also to be found on *Heracleum* and allied plants. *Gonyglossum wiedemanni* Mg. is not uncommon on the White Bryony (*Bryonia dioica* L.). Though the imago fly of *Spilographa zœe* Mg. is so seldom met with, yet as a larva it is probably the commonest Trypetid in the District, being exceedingly abundant as a leaf-miner of the Oxford Ragwort (*Senecio squalidus* L.) everywhere in the City; it also feeds on many species of cultivated Compositae. The rare and local *Trypeta acuticornis* Lw., whose larvae feed within the involucre of the Woolly-headed Thistle (*Cnicus eriophorus* L.), was bred by the writer for the first time in this country last year. *T. colon* Mg. has been bred from the old seed-heads of the Knapweed (*Centaurea Scabiosa* L.). *Urophora solstitialis* L. and *U. stylata* F. can be bred freely from the hard woody gall formed within the involucre of the Thistles *Carduus nutans* L. and *Cnicus lanceolata* L. The larvae of *U. cardui* L. galls the stem of the Creeping Thistle (*C. arvensis* Curt.); *U. quadrifasciata* Mg. has only been bred from the seed-heads of Knapweed (*Centaurea nigra* L.). *Carphotricha*

guttularis Mg., not rare, by sweeping ragwort, Shotover Hill. *Tephritis absinthii* F., once only near Cowley. *Euaresia conjuncta* Lw., not common, Shotover. *Urellia cometa* Lw., decidedly rare, once only, Shotover Hill: *U. stellata* Fuessl. is also rare, Tubney sand-pit (J. Collins).

LONCHAEIDAE AND SAPROMYZIDAE

Lonchaea flavidipennis Ztt., Old Hinksey, bred from turnips; *L. deutschii* Ztt., Shotover. *Palloptera saltuum* L., *P. ustulata* Fln., *P. umbellatarum* F. and *P. arcuata* Fln. are all generally distributed and fairly common; whilst the common *P. trimacula* Mg. was bred in numbers from larvae which feed gregariously in old root stocks of *Angelica*. *Toxoneura muliebris* Harr. occurs sparingly, once in some numbers on the Running Ground fence, Iffley Road. *Peplomyza litura* Mg. is rather scarce; one example was bred from a larva mining a withered crab-apple leaf from Bagley Wood (E. G. R. Waters).

Many species of *Sapromyza* have been captured, mostly common and generally distributed; *S. illiota* Lw., *S. bipunctata* Mg., *S. sexpunctata* Mg., *S. anisodactyla* Lw. and *S. difformis* Lw. appear to be uncommon. *Lauzania cylindricornis* F. and *L. amica* Hal., Bagley Wood; *L. elisae* Mg., Headington Wick Copse, are scarce.

OPOMYZIDAE AND SEPSIDAE

Pelethophila lutea Fln. and *P. flava* L. are both sometimes abundant in the windows of the University Museum; a much smaller species (not yet described) has been bred from old nests of blackbirds and thrushes found in the University Parks. Various species of *Sepsis* are generally common, and are occasionally seen in immense numbers congregating together in a small space. *Saltella sphondylii* Schrk.,

Shotover; *S. nigripes* Dsv., Water Eaton (J. Collins). The scarce *Mycetaulus bipunctatus* Fln. has been bred from old robins' and hedge sparrows' nests from Headington Hill and Shotover.

PIOPHILIDAE AND GEOMYZIDAE

The larvae of the cheese-hopper *Piophilula casei* L. is often only too common in old cheese; *P. varipes* Mg., *P. vulgaris* Fln. and *P. nigriceps* Mg. are all fairly common. *Geomyza marginella* Fln. by sweeping *Filago*, Tubney (J. Collins); *G. obscurella* Fln. is not uncommon around the sand-pit at Tubney; the curious semi-apterous *G. sabulosa* Hal. was once found not uncommonly on Shotover Hill; and from old birds'-nests in the University Parks *G. pedestris* has been bred.

EPHYDRIDAE

Quite small flies, usually found on wet mud at margins of ponds and streams or resting on water-plants. Only forty species have so far been obtained. *Notiphila venusta* Lw., 'Mesopotamia,' University Parks; *N. cinerea* Fln., Brasenose Common. *Discomyza incurva* Fln., Shotover. *Athyroglossa glabra* Mg., 'Mesopotamia.' *Psilopa nitidula* Fln., beaten from furze, early March, Shotover. Six species of *Hydrellia*, mostly common. *Philhygria picta* Fln., Shotover; *P. punctatonervosa* Fln., Tubney sand-pit; *P. stictica* Mg., Hogley Boy; *P. interrupta* Hal. in window, University Museum; *P. flavipes* Fln., Stow Wood; *P. posticata* Mg., Brasenose Common; *P. interstincta* Fln., University Parks; *P. semialata* Coll.: this small semi-apterous species was discovered in proximity to nests of sand-martins in a stone-pit near Cumnor, July 1910, by Mr. J. Collins, and described as new in 1913 by Mr. J. E. Collin. *Hyadina guttata* Fln., *H. nitida* Mcq., *Pelina aenea*

Fln. and *P. aenescens* Stnh. from Shotover Hill. *Caenia curvicauda*, Hogley Bog. *Calliophrys riparia* Fln. was bred from larvae found in submerged moss growing on the sluice in 'Mesopotamia,' University Parks.

DROSOPHILIDAE

The leaf-mining *Scaptomyza flaveola* Mg. was bred from a cruciferous plant in the Museum Grounds; *S. graminum* Fln., bred from *Barbarea vulgaris* R. Br., Kirtlington (O. W. Richards); *S. tetrasticha* Becker, bred from a pupa found in a mole's nest, Lye Hill: these are all fairly common species. Nine species of *Drosophila* have occurred, including the well-known 'Vinegar-fly.'

CHLOROPIDAE

This family includes several of the farmers' worst enemies, in the 'Gout-fly' of the barley (*Chlorops taeniopus* Mg.) and the Frit-fly (*Oscinis frit* L.). Nearly fifty species have been collected in the District, and these include a few interesting forms. The curious cigar-like gall formed in the Common Reed (*Phragmites communis*) by the larva of *Lipara lucens* Mg. has been found several times by the writer near Iffley. *Platycephala planifrons* F., from the peat-pits, Weston-on-the-Green (J. Collins). *Anthraco-phaga frontalis* Mg., Yarnton (J. Collins). *Diplotoxa approximattonervis* Ztt., beaten from furze, Shotover Hill; *D. limbata* Mg., Hogley Bog. *Chlorops rufina* Ztt., Shotover; *C. gracilis* Mg. and *C. interrupta* Mg. from Wytham Park (J. Collins); *C. serena* Lw., Bagley Wood; *C. hypostigma* Mg., Brasenose Common and Bayswater Mill, may be mentioned. Over a dozen species of *Oscinis* have been obtained, including the interesting *O. pratensis* Meig., of which eight examples were bred from a single spider's egg-mass,

spun in a grass-head. from near Cowley. In addition to the common *Elachyptera*, the rarer *E. tuberculifera* Corti and *E. megaspis* Lw. from Shotover, the latter beaten from furze.

MILICHIDAE

The parasitic *Cacoxenus indagator* Lw. has been bred by the writer from the cells of the Mason Bee (*Anthophora pilipes* F.), and one example was taken in the window of the University Museum. A *Meoneura*, species not yet described, has been bred in some numbers from old black-birds' and other nests from the University Parks.

AGROMYZIDAE

An interesting family of small flies, the majority of which are leaf-miners, and a few mine the stems. Most of them are attached to particular plants, from which they seldom deviate, whilst several species attack the leaves of many plants, usually, but not always, of the same Natural Order. For several years past the writer has given a great deal of time and attention to this family, and has succeeded in rearing a large number of interesting forms, some being bred for the first time. In all about fifty species have been bred from the District, in addition to a few others which have been captured. The University Parks has been a fruitful source from which a large number of mines have been obtained. Mr. E. G. R. Waters has been of great assistance to the writer in bringing him various mined leaves that he has found in his search for Micro-Lepidoptera. It is only possible to mention a few of the more characteristic species. *Agromyza phragmitidis* Hend. makes a long whitish mine in leaves of the Common Reed; *A. reptans* Fln. a large blotch mine in *Urtica dioica* L.; *A. pygmaea* Mg. mines the grass *Brachypodium sylvaticum* R. and S.

Domomyza nana Mg., tortuous mines in *Medicago maculata* Sibth. *Melanagromyza aeneiventris* Fln. mines in the stems of *Carduus arvensis* Curt. and other thistles; *M. lappae* Lw. in stems of *Arctium Lappa* L. *Ophiomyia lamii* Kalt., blotch mine in *Ballota nigra* L. *Dizygomyza iraeos* Hardy, long whitish mine in *Iris pseudacorus* L.; *D. labiatarum* Hend. mines the leaves of *Stachys sylvatica* L. and *Lamium album* L.; *D. artemisiae* Kalt., a blotch mine in leaves of *Artemisia vulgaris* L. *Liriomyza pusilla* Mg. from various plants, *Euphorbia*, *Hieracium*, *Companula*, *Bellis*, *Melilotus*; *L. pusio* Mg. from *Vicia cracca* L. *Napomyza glechomae* Kalt. from *Nepeta Glechoma* Benth. *Phytomyza conyzae* Hend. mines along the mid-rib of *Pulicaria dysenterica* Gaert.; *P. kaltenbachii* Hend. from *Clematis vitalba* L. and cultivated *Clematis*; *P. tridentata* Lw. mines the leaves of *Salix*; *P. populi* Kalt., tortuous mines in leaves of *Populus serotina* Hart.; *P. aquilegiae* Hardy, a blotch mine, and *P. minuscula* Gour., a tortuous mine, both from *Aquilegia vulgaris* L.; *P. sphondylii* Dsv., long tortuous mines in *Heracleum*; *P. crassiseta* Zett., mining leaves of *Veronica Chamaedrys* L. and *V. officinalis* L.; *P. ilicis* Curt., large yellow blotch mine in leaves of the holly; *P. periclymeni* Meij., mining leaves of *Leycesteria formosa*; *P. primulae* Dsv., long tortuous mines in leaves of the Primrose. *Cerodontha spinicornis* has been taken at Shotover and Bagley Wood; *Ceratomyza denticornis* Pz. at Hogley Bog; *Liomyza laevigata* Mg. near Shotover; and *Leucopis obscura* Hal. in the University Parks.

ASTIAIDAE

Astia concinna Mg. scarce, once only in house; *A. amoena* Mg. is common everywhere, especially in houses and on windows.

BORBORIDAE

These small flies are abundant everywhere, and are obtainable all the year round. Their habitat varies according to the species; thus many affect decaying vegetable matter, haystack refuse, horse-droppings, moles'-nests, mouse-nests, dead animals or birds, and are also found in the house and windows. At present about sixty species are known from the District. *Borborus longipennis* Hal. and *B. pedestris* Mg. from grass-tufts, Hogley Bog; *B. suillorum* Hal. under dead pigeon, Hen Wood; *Sphaerocera monilis* Hal., Headington Hill; *S. eximia* Coll. and *S. denticulata* Mg., Shotover Hill. *Limosina acutangula* Ztt., fairly common under horse-droppings; *L. coenosa* Rdi., *L. pseudonivalis* Rdi. and *L. heteroneura* Hal. are not rare in moles'-nests; *L. pullula* Ztt. from fungus, Hogley Bog; *L. plumosula* Rdi. in windows of University Museum; *L. parapusio* Dahl. and *L. liliputana* Rdi., Shotover Hill.

PHORIDAE

The same remarks apply to this family as to the preceding. Only about thirty species have so far been named, but many more await identification. *Conicera atra* Mg., *Gymnophora arcuata* Mg. and *Trineura aterrima* F. are fairly common. *Phora unispinosa* Ztt., *P. pygmaea* Ztt. and *Aphiochaeta brunneipennis* Costa in windows, University Museum; *A. brevicostalis* Wood and *A. minor* Ztt., Shotover Hill; *A. rata* Wood can be bred commonly from old birds'-nests. The exceedingly small *Pseudacteon formicarum* Verr. is not uncommon when the nest of the ant, *Lasius niger* L., is disturbed. *Metopina galeata* Hal. not uncommon.

HIPPOBOSCIDAE

These very peculiar flies live as parasites on animals and birds. *Ornithomyia avicularia* L. has been found on various birds, including the Thrush and Tawny Owl; also in the window of the University Museum. *Stenopteryx hirundinis* L. is common on the House Martin. *Oxypterus pallens* Leach is common on the Swift. The Sheep-tick, *Melophagus ovinus* L., is only too abundant.

BRAULIDAE

Braula caeca Nitz. was found on Hive Bees by Dr. Helen Goodrich.

SIPHONAPTERA (FLEAS)

The arrangement and nomenclature followed is that of the Synopsis of the Order published in the *Ent. Mo. Mag.*, 1915, by the late Hon. N. C. Rothschild, M.A., F.L.S., F.E.S., who named nearly all the specimens for the writer. My friend Mr. H. Britten, F.E.S., also assisted in naming others obtained at a later date. The writer has been helped in specimens and records by the following friends: H. Britten, J. Collins, C. S. Elton, B.A., and Commander Walker, M.A. The hosts as given are from those found in the District.

Pulex irritans L. needs no comment, sometimes found on dogs and cats. *Archaeopsylla erinacei* Bouché, common on the Hedgehog (*Erinaceus europaeus*). *Ctenocephalus canis* Curtis, not common, on dogs, cats and ferrets; *C. felis* Bouché, very common on dogs and cats. *Spilopsyllus cuniculi* Dale, abundant on the Rabbit (*Oryctolagus cuniculus*). *Ceratophyllus gallinulae* Dale, from various birds' nests; *C. styx* Roths. from nests of the Sand Martin (*Cotile riparia*), Shotover and Tubney; *C. hirundinis* Curtis,

very common in house martins' nests; *C. garci* Roths., from old birds'-nests; *C. gallinae* Schrank, in numbers from wren's nest, Cowley, and in starling's nest, University Museum; *C. fringillae* Walk., common in house sparrows' nests. *C. fasciatus* Bosc., in mouse nest, Tubney, and from rats, Museum Grounds; *C. sciurorum* Schrank, common on the Squirrel (*Sciurus vulgaris*), Shotover; *C. penicilliger* Grube, on house mouse, and from nest and on the Field Mouse (*Apodemus sylvaticus*), Shotover and Bagley Wood; *C. walkeri* Roths., not common, from the bank vole, Bagley Wood, and in mouse nest, Tubney; *C. turbidus* Roths., from vole (? *Microtus*) runs at Kirtlington. *Ctenophthalmus agyrtes* Heller and *C. bisectodentatus* Kolen. are both abundant in the nests of the Mole (*Talpa europaea*). *Rhadinopsylla pentacanthus* Roths. from the Bank Vole (*Erotomys glareolus*), Bagley Wood. *Doratopsylla dasyncnemus* Roths. and *Palaeopsylla sorecis* Dale from the Shrew (*Sorex araneus*), Shotover and Bagley Wood. *Leptopsylla musculi* Dugès from the house mouse. *Typhlocerus poppei* Wagn., rare, in nest of the Long-tailed Field Mouse (*Apodemus sylvaticus*), Tubney. *Hystrichopsylla talpae* Curtis, abundant in moles'-nests, occasionally in field-mouse nests, once from house mouse. *Ischnopsyllus octactenus* Kolen., from the Pipistrelle Bat (*Pipistrellus pipistrellus*); *I. hexactenus* Kolen. and *Nycteridopsylla longiceps* Roths. from the Long-eared Bat (*Plecotus auritus*).

HEMIPTERA

BY JOSEPH COLLINS

THE principal collecting localities within a radius of seven miles from Carfax, the centre of Oxford, have already been commented on in connection with other Orders of Insects, and the names of those within easy reach of the city—Bagley Wood, Wytham Park, Cothill and Tubney in Berkshire, and Shotover, Wood Eaton, Yarnton, Waterperry Woods and others in Oxfordshire—will by this time be familiar to most of our readers.

In the *Victoria County History of Berkshire* ('Insects'), Mr. W. Holland of the Oxford University Museum recorded in 1905 a fair number of Hemiptera from that part of the county adjacent to Oxford; and the late Mr. E. A. Butler, who after the death of Edward Saunders in 1910 became the recognised authority on the Order in Britain, obtained a number of useful records from Fyfield, near Tubney. This locality is just beyond the limits of the District as defined, but the names of those species found there, which have not been met with by other collectors, have been included in the list.

The large family Capsidae has received but little attention in the past, but over 100 species have been obtained in the District by the present writer, and many more will certainly be found by close and diligent collecting.

A fairly good list of the HOMOPTERA has been brought together, but much remains to be done with these obscure

and often difficult insects. Special attention was given by the writer to the local Homoptera in 1910 and 1911, and a good many interesting forms were detected, the number of species previously recorded from Berkshire being largely augmented. As far as the family Jassidae the following list may be regarded as being fairly complete, but much work remains to be done in the succeeding families, notably in the fragile Typhlocybidae, many species of which are most abundant; thus *T. ulmi* L. swarms in late autumn among the elms in Parks Road opposite the University Museum.

During his residence at Oxford some few years ago, Mr. H. Britten gave some attention to the minute gregarious Psyllidae, as well as to the Aphididae. His records of the former are included under that Family, but those of the latter are not at present available. Finally, Commander J. J. Walker, whose experience of collecting in the District dates from 1904, has added a number of interesting records in most of the families of the Hemiptera.

The classification adopted for the Heteroptera is that used by E. A. Butler in the text of his great work, *A Biology of the British Hemiptera-Heteroptera* (1923), and the arrangement of J. Edwards in his *Hemiptera-Homoptera of the British Islands* (1896) has been followed as regards these insects. The great majority of the species included in the list have been taken or observed by the present writer, and the initials of the other collectors who have contributed to the present list are as follows:

H. B. = H. Britten, F.E.S.

E. A. B. = E. A. Butler, B.A., B.Sc., F.E.S.

W. H. = W. Holland.

J. J. W. = J. J. Walker, M.A., R.N., F.L.S.

Of the 473 species of Heteroptera enumerated as British by Mr. Butler, 243 have up to the present been recognised

as occurring within the limits of the Oxford district, or 51·3 per cent. of the entire number.

HEMIPTERA-HETEROPTERA

Family PENTATOMIDAE.

Podops inunctus F. Tubney, Berks; Bletchingdon, Oxon.

Thyreocoris (*Corimelaena*) *scarabaeoides* L. Tubney, not rare by sweeping.

**Sehirus bicolor* L.

S. biguttatus L. Waterperry Wood, Oxon.

S. luctuosus M. et R. Tubney, under radical leaves of

Echium vulgare, and in sand-pits.

Gnathoconus albomarginatus F. Tubney.

Neottiglossa pusilla Gm. Tubney; Yarnton, Oxon.

**Pentatoma* (*Tropicoris*) *rufipes* L.

Dolycoris baccarum L. Bagley Wood, Berks (W. H.); Tubney, on *Teucrium*.

Pentatoma prasina L. Bagley Wood.

**Piezodorus lituratus* F.

Picromerus bidens L. Tubney; Yarnton, from tallows.

Rhacognathus (*Asopus*) *punctatus* L. Tubney, one example, July 1917.

Troilus (*Podisus*) *luridus* F. Tubney, October. Most frequently met with as a larva; one specimen bred October 1919.

Zicrona caerulea L. Wytham Park, Berks; Headington Wick, Oxon (J. J. W.).

Acanthosoma haemorrhoidale L. Wytham.

A. dentatum De G. Hen Wood, Berks.

**A.* (*Elasmostethus*) *griseus* (*interstinctum* L.).

Family COREIDAE.

Verlusia rhombea L. Boar's Hill ; Tubney.

Syromastes marginatus L. Boar's Hill (W. H.).

Coriomeris denticulatus Scop. Tubney.

Stenocephalus medius M. et R. Wytham Park, Berks
(J. J. W.).

Corizus capitatus F. Wytham Park (J. J. W.).

Myrmus miriformis Flin. Tubney ; the Macropterous
form not rare.

Family LYGAEIDAE.

Nysius thymi Wolff. Tubney (W. H.).

Cymus claviculus Fall. Tubney ; one example, August
1914.

C. glandicolor Hahn. Cothill ; Yarnton, Stanton St.
John, Oxon.

Ischnodemus sabuleti Fall. Tubney, August 1905, rare
(J. J. W.).

Heterogaster urticae F. Tubney (W. H.) ; Cothill
(J. J. W.).

Rhyparochromus dilatatus H. S. Tubney, one example,
September 1905.

R. chiragra F. Tubney, in sand-pit ; Boar's Hill.

Plinthisus brevipennis Latr. Tubney, Macropterous
and Brachypterous forms.

Acompus rufipes Wolff. Cothill ; King's Weir (Berks) ;
Yarnton.

**Stygnus rusticus* Fall.

**S. pedestris* Fall.

**S. fuliginus* Geoffr.

Peritrechus geniculatus Hahn. Tubney ; under and
among heather, August 1915.

**P. sylvestris* F. (*luniger* Schiff.).

Trapezonotus arenarius L. Tubney.

Aphanus lynceus F. Tubney ; not rare under *Echium* in July.

Drymus pilipes Fieb. Bagley Wood.

D. latus D. and S. Tubney, 1915 ; Enslow Bridge, Oxon, 1911.

**D. sylvaticus* F.

**D. brunneus* Sahlb. Among dead leaves in woods.

**Notochilus contractus* H.-S.

Scolopostethus pictus Schill. Near Cothill, at bottom of clover-stack, 1911 ; Weston-on-the-Green, Oxon, in haystack, April 1912.

S. grandis Horv. Weston-on-the-Green, one example.

**S. affinis* Schill. Among nettles.

S. thomsoni Reut. (*neglectus* Edw.). Cothill ; Wood Eaton.

S. decoratus Hahn. Bladon, Oxon, among heather.

S. puberulus Horv. Weston-on-the-Green ; a good series.

Gastrodes ferrugineus L. Tubney, on spruce and Scots pine.

Family BERYTIDAE.

Berytus clavipes F. Bayswater Down, near Headington, Oxon ; bred from larvae on *Ononis* (H. B.).

B. minor H.-S. Tubney ; Bletchingdon.

B. montivagus Fieb. Wytham Park, 1912, two examples.

B. signoreti Fieb. Gosford, Oxon, one.

B. crassipes H.-S. Tubney ; one example, 1915.

Metatropis rufescens H.-S. Bagley Wood (A. H. Hamm and H. B.) ; Prattle Wood, Oxon (J. J. W.) : on *Circaea lutetiana*.

Family TINGIDAE.

**Piesma maculata* Lap.

Campylostira verna Fall. Enslow Bridge, 1913, one example under a stone.

Acalypta (*Orthostira*) *cervina* Germ. Cothill, 1909, one example.

A. nigrina Fall. Yarnton, 1916, one example.

A. parrula Fln. Tubney; Cumnor (Berks).

Dictyonota strichnocera Fieb. Tubney, beaten from furze.

D. tricornis Fall. Tubney; Cumnor.

Derephysia foliacea Fln. Godstow, Besselsleigh (Berks); Kirtlington Park, Oxon; beaten from ivy.

Monanthia ampliata Fieb. Tubney, Bladon, Yarnton.

**M. cardui* L. Common on thistles.

M. ciliata Fieb. Tubney, Bladon.

M. costata F. Yarnton; Wolvercote, Oxon.

M. humilis F. Wytham Park; Enslow Bridge.

M. (Physatochila) simplex H.-S. Tubney Wood, 1925 :
a fine series swept from *Euphorbia amygdaloides*.

Serenthia laeta Fall. Tubney, not rare (J. J. W.).

Family ARADIDAE.

Aradus depressus F. Cothill; Bladon, Elsfield (Oxon).

Aneurus laevis F. Wytham Park, under bark of spruce fir.

Family HEBRIDAE.

Hebrus ruficeps Thoms. Cothill; Yarnton.

Family GERRIDAE (HYDROMETRIDAE).

Mesovelis furcata M. et R. Fyfield, Berks (E. A. B.).

Microvelis reticulata Burm. (*pygmaea* Duf.). Fyfield (E. A. B.).

Hydrometra stagnorum L. R. Cherwell, Oxon ; Water Eaton.

**Velia currens* F.

Gerris paludum F. Fyfield (E. A. B.).

G. gibbifera Schum. Tubney ; Gosford, Oxon.

G. thoracica Schum. Tubney.

**G. lacustris* L.

G. argentata Schum. Fyfield (E. A. B.) ; Tubney ; Yarnton.

G. odontogaster Zett. Fyfield (E. A. B.).

Family REDUVIIDAE.

Ploiaria vagabunda L. Fyfield (E. A. B.) ; Godstow ; Bladon.

Reduvius personatus L. University Museum, Oxford (Prof. E. B. Poulton) ; Jesus College, Oxford (A. J. Chitty).

Coranus subapterus De G. Tubney, in sand-pits, not common (J. J. W.).

Nabis apterus F. (*brevipennis* Hahn.). In and about woods, not rare.

N. lativentris Boh. Cothill ; Tubney, three of the rare Macropterous form, October 1924 ; Wood Eaton.

**N. major* Costa. A crepuscular species.

**N. flavomarginatus* Scholtz. Macropterous forms of this species occur.

N. boops Scholtz. Tubney, rather common on one occasion (August 5th, 1915) ; Wytham Park, one example.

**N. limbatus* Dahlb.

**N. ferus* L.

**N. rugosus* L. (*N. ericetorum* Scholtz and *N. brevis* Scholtz are the only species of this genus not yet observed in the Oxford district.)

Family SALDIDAE.

Salda orthochila Fieb. Tubney ; in dry sandy places.

**S. saltatoria* L.

S. cincta H.-S. Fyfield (E. A. B.) ; Yarnton, Water Eaton, etc.

S. cocksi Curt. Cothill ; Shotover (H. B.).

Family CIMICIDAE.

Ceratocombus coleoptratus Zett. Yarnton.

Pachycoleus rufescens Fieb. One example of this very rare insect was found alive by Mr. A. H. Hamm in some moss from Cothill, with which Mr. E. G. R. Waters had packed a small pill-box. 1925.

**Cimex lectularius* L.

**Lyctocoris campestris* Fall. In haystacks.

Piezostethus galactinus Fieb. Tubney ; Enslow Bridge.

P. cursitans Fall. Wytham Park, under bark.

Temnostethus pusillus H.-S. Cothill ; Wytham Park ; Shotover (H. B.).

Anthocoris confusus Reut. Fyfield (E. A. B.) ; Tubney. Wytham Park.

**A. nemoralis* F.

A. gallarum-ulmi De G. Water Eaton ; Shotover (H. B.).

A. sarothamni D. and S. Cumnor Hurst, Berks, on broom.

**A. nemorum* L. (*sylvestris* L.).

Acompocoris pygmaeus Fall. Tubney.

A. alpinus Reut. Tubney ; Fyfield (E. A. B.).

Tetraphleps vittata Fieb. Tubney ; Cothill.

Triphleps niger Wolff. Wytham Park ; Yarnton.

**T. majuscula* Reut.

**T. minutus* L.

Cardiastethus fasciventris Garb. Tubney; a rare species.

Xylocoris ater Duf. In University Museum, Oxford.

Microphysa pselaphiformis Curt. Shotover (H. B.).

M. (Zygonotus) elegantulus Baerens. Cothill; Shotover (H. B.).

Myrmedobia distinguenda Reut. Hen Wood; Shotover (H. B.).

Family CAPSIDAE.

**Stenodema (Miris) laevigata* L.

**S. calcarata* L.

Notostira erratica L. Tubney; Yarnton.

Megaloceraea linearis Fuessl. (*longicornis* Fall). Wytham Park; Yarnton.

M. ruficornis Fourc. Tubney, Yarnton, Water Eaton.

**Leptopterna ferrugata* Fln.

**L. dolabrata* L.

Lopus gothicus L. Tubney Wood.

Pantilius tunicatus F. Bagley Wood (W. H.); Bletchington.

Phytocoris populi L.

**P. tiliae* F.

P. reuteri Saund. Fyfield (E. A. B.).

**P. varipes* Boh.

**P. ulmi* L.

Megacoelum (Calocoris) infusus H.-S. Tubney, rare.

Calocoris chenopodii Fall. Tubney.

C. bipunctatus F. Wolvercote, Oxon; Wood Eaton.

C. roseomaculatus De G. Cumnor; Tubney.

C. fulvomaculatus De G. Bagley Wood (W. H.); Wood Eaton.

C. sexguttatus F. Tubney; Wytham Park; Wood Eaton.

- C. ochromelas* Gm. (*striatellus* L.). Wytham Park;
Wood Eaton; Stanton St. John.
- Pycnopterna striata* L. Wytham Park; Stanton St.
John.
- **Stenotus (Oncognathus) binotatus* F.
- Dichrooscytus rufipennis* Fall. Cotlill; Wood Eaton :
rare.
- Plesiocoris rugicollis* Fall. Yarnton; Stanton St.
John.
- **Lygus pabulinus* L.
- **L. lucorum* Mey.
- L. spinolae* Mey. Tubney (W. H.).
- **L. pratensis* F.
- L. rubricatus* Fall. Tubney; Bladon.
- L. cervinus* H.-S. Besselsleigh; Godstow.
- **L. pastinacae* Fall. Common on wild parsnip.
- **L. kalmii* L.
- Camptozygum pinastri* Fall. Tubney, on fir trees.
- Macrolophus nubilus* H.-S. Stanton St. John.
- Polymerus (Poeciloscytus) nigrinus* Fall. Cothill;
Yarnton.
- Charagochilus (Poeciloscytus) gyllenhali* Flin. Wytham
Park; Yarnton.
- Poeciloscytus unifasciatus* F. Tubney, on *Galium*
verum.
- **Liocoris tripustulatus* F. Usually on nettles.
- **Capsus ruber* L. (*lanarius* L.).
- **Rhopalotomus ater* L.
- **Monalocoris filicis* L. Common on bracken.
- Pithanus maerkeli* H.-S. Tubney, Wytham Park;
Yarnton, Water Eaton.
- Bryocoris pteridis* Fall. On ferns in the University
Parks, Oxford (W. H.).
- Allodapus rufescens* H.-S. Fyfield (E. A. B.).

Dicyphus constrictus Boh. Wytham Wood.

**D. epilobii* Reut. On *Epilobium*.

D. errans Wolff. Tubney; Cothill.

D. stachydis Reut. Tubney; King's Weir (W. H.).

D. pallidicornis Fieb. South Hinksey, Oxon (W. H.).

D. globulifer Fall. Tubney, on *Lychnis diurna*.

Campyloneura virgula H.-S.

Orthocephalus saltator Hahn. Tubney.

O. mutabilis Fall. Yarnton.

Strongylocoris leucocephalus L. Tubney, on *Helianthemum*.

Halticus luteicollis Panz. Bladon.

H. apterus L. Cothill; Weston-on-the-Green.

Pilophorus cinnamopterus Kbm. Tubney, on fir trees.

P. clavatus L. Boar's Hill; South Hinksey (W. H.).

**Cyllocoris histrionicus* L.

**C. flavonotatus* Boh.

Globiceps flavomaculatus F. (= *selectus* Fieb.). Wood Eaton.

Aetorrhinus angulatus F. Tubney; Cothill; on alder.

Mecomma ambulans Flin. Tubney; Cothill.

Cyrtorrhinus caricis Fall. Yarnton.

Orthotylus bilineatus Fall. Tubney.

O. marginalis Reut. Tubney; Yarnton; on willow.

O. tenellus Fall. Oxford.

O. nassatus Fall. Yarnton; scarce.

O. chlopterus Kbm. Fyfield (E. A. B.).

O. scotti Reut. Waterperry Wood.

O. ochrotrichus D. and S. Tubney, abundant; Fyfield (E. A. B.).

O. diaphanus Kbm. Headington (H. B.).

O. flavosparsus Sahlb. Fyfield (E. A. B.).

O. chloropterus Kbm. Fyfield (E. A. B.).

O. ericetorum Fall. Tubney ; on heather.

(Special attention was given to this difficult genus of green Capsidae in 1922, and the determinations have been confirmed by the late Mr. E. A. Butler.)

Hypsitylum bicolor D. and S. Hen Wood (W. H.).

Loxops coccineus F. Tubney ; Wytham Park ; Enslow Bridge ; on ash.

**Heterotoma merioptera* Scop.

Heterocordylus genistae Scop. Waterperry Woods, on *Genista tinctoria*.

H. tibialis Hahn. Boar's Hill ; on broom.

Malacocoris chlorizans Fall. Waterperry Woods.

Conostethus roseus Fall. Tubney.

Hoplomachus thunbergi Fall. Wolvercote ; Yarnton.

Macrocoleus pilosus Sch. (*tanuceti* Fall.). Yarnton.

**M. hortulanus* Mey.

Amblytylus affinis Fieb. Cothill.

Macrotylus paykulli Fln. Wytham Park, on *Ononis*.

Onychumenus decolor Fall. Waterperry Woods.

**Harpocera thoracica* Fall.

Byrsoptera rufifrons Fln. Tubney ; Cothill.

**Phylus palliceps* Fieb.

P. melanocephalus L. Boar's Hill (W. H.) ; Wood Eaton.

P. coryli L. Common on hazel.

Psallus ambiguus D. and S. Wood Eaton ; Stanton St. John.

P. betuleti Fall. Cothill, on birch.

P. obscurellus Fall. Cothill.

**P. variabilis* Fall.

P. lepidus Fieb. Cothill ; Wytham Park ; Wood Eaton.

P. falleni Reut. Cothill ; Boar's Hill ; Wood Eaton.

**P. varians* H.-S.

P. salicellus Mey. Yarnton.

Sthenarus (Psallus) rotermundi Schlitz. Cothill, on poplar.

Atractotomus mali Mey. Wood Eaton; Stanton St. John.

A. magnicornis Fall. Bladon.

**Plagiognathus viridulus* Fall.

**P. arbustorum* F.

Chlamydatus pullus Reut. Tubney, on *Filago*.

Family NAUCORIDAE.

Naucoris cimicoides L. Gosford Bridges; R. Cherwell; Fyfield (E. A. B.).

Aphelochirus montandoni. Gosford Bridges; Duke's Cut, Oxon (J. J. W.). Taken by the Rev. F. W. Hope near Bagley Wood, and by Prof. Westwood in the Evenlode near Eynsham.

Family NEPIDAE.

**Nepa cinerea* L.

Ranatra linearis L. Pond on Frilford Heath, Tubney (J. J. W.).

Family NOTONECTIDAE.

**Notonecta glauca* L.

Family CORIXIDAE.

Corixa sahlbergi Fieb. Fyfield (E. A. B.); Gosford Bridges.

C. linnaei Fieb. Fyfield (E. A. B.); Gosford Bridges.

C. striata Fieb. Fyfield (E. A. B.); Gosford Bridges.

C. distincta Fieb. Fyfield (E. A. B.); Gosford Bridges.

C. falleni Fieb. Gosford Bridges.

C. moesta Fieb. Tubney (W. H.).

Micronecta (*Sigara*) *minutissima* L. Gosford Bridges
(J. J. W.).

HEMIPTERA-HOMOPTERA

Family MEMBRACIDAE.

Centrotus cornutus L. Occurs in all the woods near
Oxford.

Family CIXIIDAE.

**Cixius nervosus* L.

**C. pilosus* Ol.

Family DELPHACIDAE.

Liburnia (*Megamelus*) *notula* Germ. Yarnton ;
Weston-on-the-Green.

L. quadrimaculata Sign. Cothill ; Wytham Park.

L. (*Kelisia*) *guttula* Germ. Tubney ; Yarnton ;
Weston-on-the-Green.

L. (*Chloriona*) *collina* Boh. Wytham Park.

L. elegantula Boh. Tubney ; Yarnton ; Stanton St.
John.

L. lepida Boh. Tubney, rare ; two specimens in 1912.

L. leptosoma Fln. Tubney, on rushes ; Cothill ;
Bladon.

L. pellucida F. Tubney ; Cothill ; Wytham Park ;
Enslow Bridge.

**L. difficilis* Edw.

**L. discolor* Boh.

L. forcipata Boh. Tubney ; Wood Eaton ; Stanton
St. John.

L. denticauda Boh.

L. exigua Boh. Cothill; Cumnor.

L. limbata F. Tubney (Macropterous ♀); Cothill; Yarnton.

L. mesomela Boh. Stanton St. John.

Dicranotropis hamata Boh. Tubney; Wytham Park; Yarnton.

Stiroma albomarginata Curt. Tubney; Cothill; Wytham Park.

**S. pteridis* Boh. Common on bracken in woods.

S. bicarinata H.-S. Wytham Park; Bladon.

Family CERCOPIIDAE.

**Triecphora vulnerata* Ill. Common in all the woods.

Aphrophora alni Fall. On alders.

**A. salicis* De G. Common on *Salix*.

**Philaenus spumarius* L.

P. campestris Fall.

P. exclamationis Thunb.

P. lineatus L. The three preceding are common at Tubney, Yarnton, etc.

Family LEDRIDAE.

Ledra aurita L. On oaks at Tubney Wood, rare (J. J. W.).

Family PAROPHIDAE.

Megophthalmus scanicus Fall. Tubney, common.

Family BYTHOSCOPIIDAE.

**Macropsis lanio* L. By sweeping in woods.

Bythoscopus alni Schr. Wytham Park, Yarnton, Waterperry Wood.

B. rufusculus Fieb. Cothill.

- B. flavicollis* L. Cothill ; Boar's Hill (W. H.).
Pediopsis tiliae Germ. Wytham Park. rare.
P. scutellatus Boh. Wytham Park ; Enslow Bridge.
P. tibialis Scott. Wytham Park ; Besselsleigh.
P. ulmi Scott. Yarnton.
P. ccreus Germ. Yarnton.
P. virescens Fall. Yarnton.
Idiocerus tremulae Estl. Wood Eaton.
I. lituratus Fall. Water Eaton.
I. fulgidus F. Yarnton ; Bladon.
**I. populi* L. Common on poplars.
Agallia puncticeps Germ. Wytham Park ; Summer-town ; Yarnton.

Family TETTIGONIDAE.

- Evacanthus interruptus* L. Cothill ; Yarnton.
E. acuminatus F. Cothill ; Wytham Park ; Yarnton.
Tettigonia viridis L. Tubney ; Cothill ; Yarnton.

Family ACOCEPHALIDAE.

- Acocephalus nervosus* Schr. Tubney ; Yarnton.
A. bifasciatus L. Tubney ; Cumnor ; Wood Eaton.
A. albifrons L. Cothill ; Weston-on-the-Green.
A. brunneofasciatus Geoff. Cumnor ; Wood Eaton.
A. flavostriatus Don. Tubney ; Wytham Park ; Bletchington.
Eupelix cuspidata F. Tubney ; Cothill.
Platymetopius undatus De G. Tubney.
Glyptocephalus proceps Kbm. Tubney, in sand-pit.

Family JASSIDAE.

- Athysanus lineolata*. Wytham Park.
A. obscurellus Kbm., Wytham Park.

- Deltocephalus pascuellus* Fall. Fyfield (E. A. B.).
D. ocellaris Flin. Tubney ; Cothill ; Fyfield (E. A. B.).
D. argus Marsh. Tubney ; Wytham Park.
D. pulicaris Fall. Fyfield (E. A. B.).
Allygus mixtus F. Tubney ; Wytham Park ; Wood
 Eaton.
Thamnotettix subfuscus Fall. Tubney (W. H.) ; Wood
 Eaton.
T. splendidula F. Godstow.
T. crocea H.-S. Wytham Park ; Yarnton.
Limotettix antennata Boh. Hogley Bog, Oxon.
L. quadrinotata F.
L. sulphurella Zett. Fyfield (E. A. B.).
Cicadula metria Flor. Fyfield (E. A. B.).
C. sexnotata Fall. Ferry Hinksey (W. H.).
C. cyanae Boh. Fyfield (E. A. B.).

Family TYPHLOCYBIDÆ.

- Alebra albostriella* Fall. Waterperry Wood ; Fyfield
 (E. A. B.).
Dicraneura flavipennis Zett. Fyfield (E. A. B.).
 **Eupteryx vittatus* L. Common on nettles.
E. auratus L. Sunnymead, Oxford, on hollyhocks.
E. atropunctata Goeze. Tubney (W. H.) ; Fyfield
 (E. A. B.).
Typhlocyba ulmi L. Parks Road, Oxford, abundant
 on elms.
T. geometrica Schr. Tubney.

Family LIVIIDÆ.

- Livia juncorum* Latr. Bayswater Down ; Open
 Brasenose, Oxon (H. B.).

Family APHALARIDAE.

- Rhinocola ericae* Curt. Tubney.
R. aceris L. Headington ; Shotover ; Open Brasenose (H. B.).
R. eucalypti Maskell. Headington Hill on *Eucalyptus* (H. B.). An introduced species.
Aphalara picta Zett. Bagley Wood ; Tubney (H. B.) ; King's Weir.
A. nebulosa Zett. Bagley Wood (H. B.) ; Bladon.
A. exilis Web. et Mohr. Tubney.
A. calthae L. Tubney ; Headington Wick (H. B.).
A. nervosa Först. Cothill ; Shotover ; Headington (H. B.).

Family PSYLLIDAE.

- Psyllopsis fraxinicola* Först. Hogley Bog ; Shotover ; Headington (H. B.).
P. fraxini L. Tubney ; Wytham ; Shotover ; Headington ; University Parks (H. B.).
P. distinguenda Edw. Cothill ; Shotover Road (H. B.).
P. discrepans Flor. Shotover Road and Thame Park, Oxon (H. B.).
Psylla klapaleki Sulç. Hogley Bog ; Headington Wick (H. B.).
P. pruni Scop. Wytham Park.
P. salicicola Först.
P. melanoneura Först. Shotover, Bayswater, University Parks (H. B.).
P. nigrita Zett. Shotover, Bayswater (H. B.).
P. hartigii Flor. Cothill ; Shotover (H. B.) ; ab. *venata* Edw., University Parks (H. B.).
P. peregrina Först. Yarnton ; Shotover, Headington, etc. (H. B.).

- P. mali* Schmdbg. Bladon ; Shotover, Headington, Beckley, Wheatley (H. B.).
P. sorbi L. Headington, on *Pyrus aucuparia* (H. B.).
P. alni L. Shotover, Bayswater, Hogley Bog (H. B.).
P. ulmi Först. Gipsy Lane, Headington, on European white elm, July 1916 (H. B.).
P. försteri Flor. Hitch Copse, Cothill · Shotover, Hogley Bog, etc. (H. B.).
P. buxi L. University Parks ; Shotover (H. B.).
P. spartii Guér. Boar's Hill ; Shotover (H. B.).
Livilla ulicis Curt. Tubney Wood ; Cothill, on *Genista*.

Family TRIOZIDAE.

- Trichochermes walkeri* Först. Brasenose Lane (H. B.) ;
Fyfield (E. A. B.).
Trioza albiventris Först. Hogley Bog (H. B.).
**T. urticae* L.
T. galii Först. Bayswater (H. B.).

ARACHNIDA

BY A. W. PICKARD-CAMBRIDGE

PROBABLY the chief centre of interest for arachnologists visiting Oxford will be the collection of the late Rev. O. Pickard-Cambridge, F.R.S., which, on his death in 1917, became part of the Hope Collections in the University Museum. The collection is contained in about 6000 bottles and two or three cabinets; it includes not only his own collection, but also that of his nephew, the late Frederick O. Pickard-Cambridge, and the few remains of the spiders which belonged to Mr. John Blackwall, the first great British arachnologist. The British Collection is separate from the Foreign. The classification is (as nearly as possible) that which Mr. Pickard-Cambridge himself adopted provisionally in his later years, but he recognized that the classification of the Araneidea generally was in a state of transition, and the latest publications of some French writers on the subject propose very considerable changes. In addition to the systematic British and Foreign Collections, there are a great number of bottles of specimens arranged by localities and countries; these consist mainly of common species, which remained after specimens of greater interest had been absorbed into the systematic collections. His large library of Arachnological books is also housed in the Hope Department, and it is hoped that some day it may be possible to bring this up to date. It is very fairly complete up to a few years after the

beginning of the present century, and a catalogue of it is in the Press.

The country round Oxford has never been thoroughly worked for Arachnida. A little collecting was done in the middle of the last century by Mr. R. H. Meade of Bradford ; the Rev. O. Pickard-Cambridge himself paid short visits to Oxford in the '60's and '70's, and collected principally in Wick Copse and Bagley Wood ; and his sons were from time to time able to send him small consignments of specimens. The naturalists who have been connected with the Hope Department have also at times paid some attention to the subject : Professor Westwood took a good deal of interest in it : Commander Walker has supplied many species in the course of his indefatigable explorations of the neighbourhood : the name of Mr. W. Holland appears frequently in Mr. Pickard-Cambridge's lists of spiders received from the District : and Mr. J. Collins, especially from 1912-1914, collected Arachnida energetically and greatly increased the local list. In 1911 Mr. Pickard-Cambridge published (in the Ashmolean Society's *Report*) the names of 138 species of Araneidea, and of Phalangidea, as an Oxfordshire list : Mr. Collins added to these 30 species of Araneidea, 1 Phalangid, and 3 Chernetidea (False Scorpions), and also took in Berkshire (nearly all in the neighbourhood of Oxford) 117 species of Araneidea, 6 of Phalangidea, and 5 of Chernetidea, working mainly in the excellent localities of Tubney, Cothill, and Wytham. (The British species of Araneidea are about 550 in number, of Phalangidea 24, of Chernetidea 20, so that much remains to be done.)

It is natural that the greater number of the species found in the neighbourhood should be the commoner and more conspicuous. But Mr. Collins discovered at Cothill in 1912 a new species (named after him, *Collinsia notabilis* O. P.-C.)

which is still represented only by the single specimen, of very minute size, which he found. Another great rarity, *Scytodes thoracica* Fabr., was found by the Rev. O. Pickard-Cambridge at St. Alban Hall (now part of Merton College) about sixty years ago, but has not been seen here since. Of the Dysderidae and Drassidae, most of which are found lurking under stones, bark, etc., a very fair number of the less rare kinds are recorded, besides one very uncommon species, *Drassus pubescens* Thor. Of the Dictynidae, the rare and local *Dictyna pusilla* Westr. taken many years ago in Wick Copse is the most notable. The largest of the Agelenidae, *Tegenaria atrica* C. L. Koch and *T. parietina* Fourcroy, are found very commonly—the latter being a bugbear of diligent housemaids. Some very large specimens have been found in Oxford, especially in the precincts of the Museum. (This is the spider which is said to have frightened Cardinal Wolsey, and has been called ‘the Cardinal’ ever since.) The well-known Water-spider, *Argyroneta aquatica* Latr., which belongs to the same family, is not infrequent around Oxford.

The Theridiidae consist mainly of very minute spiders, the diagnosis and classification of which still give rise to some controversy; and hard work in any neighbourhood usually produces new species. That discovered by Mr. Collins has already been mentioned. Among the rare and local species of the family are *Theridion formosum* Clerck, taken by the same collector at Bladon; *Th. blackwallii* Cambr. found by Mr. Pickard-Cambridge at Oxford; *Enoplognatha thoracica* Hahn, taken at Kirtlington; *Asagena phalerata* Panzer, at Tubney; *Laseola inornata* Cambr. at Cothill; and *Baryphyma pratensis* Blackw. (a characteristic Wicken species) at Yarnton—the last four all by Mr. Collins. To the above may be added the rare *Troxochus ignobilis* Cambr., of which one male and two females were taken at

Hogley Bog in October 1921 by Mr. A. Randell Jackson (*Proc. Dorset Nat. Hist. and Antiq. Field Club*, April 1924), and *Porrhomma campbelli* Cambr. found in moles'-nests at Lye Hill in 1919 by Mr. A. H. Hamm.

The Epeiridae contain many of the best-known and most brightly-coloured spiders, and the genus *Epeira* is itself represented here by nine species; of these the rarest is *Epeira westringii* Thor. (not easily distinguishable at first sight from the common *E. cucurbitina* Clerck, with its bright green body); this was captured by Mr. Collins at Wytham in 1912. Besides the two commonest and most beautiful species, *E. quadrata* Clerck and *E. diademata* Clerck, the more local *E. pyramidata* Clerck is not rare in woods near Oxford, its bright yellow and brown body making it a very attractive object. Other rare and local Epeiridae found in the neighbourhood are *Cercidia prommens* Westr., of which there are several records, and *Singa hamata* Clerck, found by Mr. Holland and Mr. Collins at Tubney and Cothill. Of the Thomisidae or 'Crab-spiders,' *Diaea dorsata* Fabr. and *Xysticus ulmi* Hahn. appear to be commoner here than in many localities; the rare *Oxyptila flexa* Cambr. was once taken at Marston Ferry by Commander Walker. The local list of Lycosidae includes most of the common species, but no great rarity. The Salticidae recorded are few; *Hasarius adansonii* Savigny, no doubt originally an imported species, has often been seen in the plant-houses of the Botanic Garden.

The Phalangidea, or 'Harvest-men,' taken in the neighbourhood include a large proportion of the common species, but a little systematic collection would soon enlarge the list.

Of the Chernetidea, or False-scorpions, two—both taken by Mr. Collins—deserve notice on account of their rarity: *Chernes dubius* Cambr. (under stones at Enslow Bridge),

and *Chernes cimicoides* Fabr. (under bark at Cothill and Wytham). The other three species recorded from these parts are *Chthonius rayi* L. Koch, *Obisium muscorum* Leach (both these very common species), and *Chelifer canceloides* Linn.

The names given show that the Oxford District, if thoroughly worked, would probably be very productive of interesting species.

THE HOPE DEPARTMENT, OXFORD UNIVERSITY MUSEUM

BY PROFESSOR E. B. POULTON, F.R.S.

THE Hope Department originated in 1849, when the Rev. F. W. Hope of Christ Church presented his Collection and Library to the University, and appointed the late Professor J. O. Westwood as Keeper. The Collections, at first kept in the Tylorian Building, were removed to the University Museum as soon as it was ready for their reception, about 1860. Probably in connection with this transference the founder established the Hope Chair of Zoology in 1861, and appointed Westwood as first Hope Professor. Mr. Hope, who had continued to augment the collections after presenting them, died in 1862, and in that year, and again in 1864, his widow increased the endowment of the Department and added to the collections. In 1909 further endowment was provided by the late Dr. G. B. Longstaff of New College.

Among the most important collections originally presented by the founder or received during Professor Westwood's tenure of the Chair (1861-1893) are the following: the Hope-Westwood private collections, rich in historic material and containing the great majority of the types of species described by these two naturalists; a fine set of the Wollaston Atlantic Coleoptera; the W. W. Saunders Lepidoptera Heterocera (types of F. Walker), Hymenoptera (types of F. Smith), Orthoptera (types of

Bates), and Economic Entomology; the Greek Hymenoptera of Sir Sydney Saunders; the Tylden Collection, principally Curculionidae; the Miers Collection, principally Coleoptera; the A. R. Wallace collections of certain groups of Malayan Coleoptera; the historic W. J. Burchell Collection from S. Africa (1810-1815), and Eastern Brazil (1825-1830); and the Bell Crustacea.

It is impossible to do justice to Professor Westwood's untiring exertions on behalf of the Hope Department, but mention must be made of his great monograph, *Thesaurus Entomologicus*, in which many of the chief treasures are described and figured, and of the *Revisio Insectorum Familiae Mantidarum*, published towards the end of his life.

The principal accessions since 1893 have been: the second set of the Godman-Salvin Lepidoptera-Rhopalocera, chiefly Central American; the Rothney Collection and Library of Oriental Hymenoptera (types of Cameron); the Pryer Bornean Rhopalocera; the Burr Orthoptera; the Pascoe Library and part of the collections; the Chevrolat and Baden-Sommer Coleoptera, Malayan Rhopalocera and other insects from the Van der Poll Collection; the Pickard-Cambridge Collection and Library of Arachnology; the H. E. Cox Collection and Library of Coleoptera; and the Rowland-Brown Collection (including the F. E. Lowe Collection) and Library of European Lepidoptera.

In addition to these collections the Hope Department has been rapidly accumulating specimens from various parts of the world, especially Africa, the principal donations having been received from Dr. G. D. H. Carpenter (Uganda), Arnold Hodson (Abyssinia), W. A. Lamborn (S. Nigeria, Tanganyika Territory, Malay Peninsula), Dr. G. A. K. Marshall (S. Africa), Dr. S. A. Neave (N. Rhodesia), the Rev. K. St. Aubyn Rogers (Kenya Col., Tang. Terr.),

Dr. V. G. L. van Someren (Kenya Col., Uganda), Major C. A. Wiggins (Uganda). Large collections from many parts of the world were bequeathed by Admiral Bourke, and presented by Herbert Druce, Dr. G. B. Longstaff, Commander J. J. Walker, and from Borneo by R. Shelford.

The Pierine Butterflies in the Department have been worked out and arranged by Dr. F. A. Dixey, the Acraeinae and other groups by Dr. H. Eltringham, the Blattidae by the late R. Shelford and more recently by Dr. R. Hanitsch. The Oriental Moths were worked out by the late Col. Swinhoe, a large part of the Hymenoptera by the late Col. C. T. Bingham and the late Edward Saunders, the Coleoptera Phytophaga by the late M. Jacoby, the Lycacnids and Hesperid Butterflies by the late H. H. Druce. The help received from the British Museum, Lord Rothschild's Museum at Tring, and Mr. J. J. Joicey's at Witley is also gratefully acknowledged.

The British collections of insects form an important feature, of especial educational value. They include the historic J. C. Dale Collection, the collections and in some instances the Entomological Libraries of the late A. J. Chitty, Prof. W. M. Geldart, Prof. R. Meldola, W. G. Pogson-Smith, and Arthur Sidgwick. The excellent condition of the Lepidoptera is due to the kind help for many years of Mr. F. C. Woodforde; the Diptera to Col. J. W. Yerbury; the Coleoptera to Mr. Horace Donisthorpe and Commander Walker; the Hymenoptera to the late Mr. Edward Saunders.

Apart from the extensive general collections which are constantly required in the study and arrangement of all other collections, the most distinctive features of the Hope Department are the series of specimens, chiefly butterflies, illustrating the problems of Insect Bionomics in all the

great Zoological Regions. In many instances the examples which have been chosen for figuring are arranged in the original order beside a copy of the published plate.

The Bionomic Collections include the following: (1) Examples of Protective or Procryptic Resemblance; (2) the Mimetic Associations, Batesian and Müllerian, of the different Zoological Provinces; models and their mimics taken on the same day by the same naturalist; all the captures made in a definite period of time, throwing light on the relative abundance of models and mimics; (3) Families of Dimorphic or Polymorphic Mimics and of Seasonal Forms with their female parents, the Mendelian relationship being evident in some of the former; (4) Direct and indirect evidence of the attacks made on butterflies by birds and lizards; Directive Marks; (5) Examples of butterflies in which scents, both Epigamic and Aposematic, have been detected; (6) Predaceous insects, especially the Asilid flies and the British Fossorial wasps, with their prey; (7) the predaceous and associated epigamic habits of certain British Empid flies; (8) the insect fauna of certain parts of the world kept as a whole and thus available for the study of the great problems of distribution and isolation; (9) Examples showing the comparison between island forms and those most nearly related to them on the adjacent continent; (10) Illustrations of insect migration and of exceptional means of distribution.

Some of the examples in the above series are of such interest as to deserve special mention, even in so brief a notice as the present. Such are the African mimetic associations collected by Dr. G. D. H. Carpenter (Uganda, Tanganyika Territory); Arnold Hodson (Abyssinia); W. A. Lamborn (S. Nigeria, Tang. Terr., Nyasaland, Malay Penins.); Dr. G. A. K. Marshall (Natal, S. Rhodesia); Dr. S. A. Neave (N. Rhodesia, Nyasaland, Tang.

Terr., Uganda); Rev. Canon K. St. Aubyn Rogers (Kenya Col., Tang. Terr.); Dr. V. G. L. van Someren (Kenya Col., Uganda); Maj. C. A. Wiggins (Uganda); Col. R. S. Wilson and Capt. A. L. Kent-Lemon (Nuba Mtns. and Mongalla Prov., Sudan).

Among the extensive series of families with their known female (sometimes also male) parents the most important are those of the African *Papilio dardanus*, bred by Dr. Carpenter (Uganda and just south of it), Mr. Lamborn (S. Nigeria), Mr. G. F. Leigh (Natal), Canon Rogers (Nairobi District), Mr. C. F. M. Swynnerton (S.E. Rhodesia), and especially Dr. V. van Someren, whose extensive experiments were conducted in the Nairobi district, although some of them included Uganda material. These last and Mr. Swynnerton's included families carried through successive generations.

Of almost equal importance is Dr. Carpenter's proof by breeding that three Uganda *Pseudacraeas*, mimicking three different Acraeine models, are forms of the single species *Ps. eurytus*, thus confirming Dr. Karl Jordan's conclusions based on the evidence of structure; also the similar evidence, obtained by the late Mr. A. D. Millar and Mr. E. E. Platt in Natal and by Mr. Lamborn in S. Nigeria, that certain common African butterflies of the genus *Hypolimnas*, mimicking two or more different Danaine models in each area, are forms of *H. dubia*; and the proof, furnished by Mr. Swynnerton in S.E. Rhodesia, Canon Rogers in Kenya Col., and Drs. V. and R. van Someren in Uganda, that certain small *Charaxes*, mimicking the different patterns of larger species in the same genus, are the polymorphic females of *C. ethalion* in S.E. Rhodesia, and of *C. etheocles* in the other districts.

The most complete research of this kind hitherto undertaken—that of Mr. J. C. F. Fryer upon the Mendelian

relation between the three female forms of *Papilio polytes* in Ceylon—is illustrated by the whole of the material.

Among the faunistic series special mention must be made of the following: Canarian Lepidoptera collected by W. Walmesley White; Hawaiian insects by Dr. R. C. L. Perkins; Fijian Rhopalocera by H. W. Simmonds; Pacific Lepidoptera by Commander Walker; Falkland Lepidoptera by Rupert Vallentin.

An earlier arrangement of the collection, obscured by the rapid growth of recent years, was the cause of much inconvenience, now happily removed by the general rearrangement which has followed the addition in 1925 of a large new room.

The Entomological Library presented by the founder was the most complete in existence. Among recent additions are the six volumes containing the coloured drawings of butterflies made 150 years ago by William Jones of Chelsea—drawings from which many species were named and described by the illustrious Fabricius. The Pickard-Cambridge Library of Arachnology, also the most complete private library of the subject, will soon be rendered still more available for reference by the appearance of a catalogue prepared by Mr. A. W. Pickard-Cambridge, M.A. Balliol.

A List of the Micro-Lepidoptera of the Oxford District

BY

E. G. R. WATERS, M.A., F.E.S.

It is purely for reasons of practical convenience that the tradition of separating Macro- and Micro-lepidoptera has been followed in the present publication. Although any dividing-line drawn between the two is necessarily arbitrary and unscientific, the distinction corresponds to a real division of labour. Few entomologists can spare the time, or combine the different methods which must be adopted, for an equally thorough study of both. The so-called Micro-lepidoptera receive so inadequate a share, considering their number and importance, of the interest of entomologists that there is ample justification for concentrating one's attention upon them. For a number of years I have found them a fascinating object of study, and have devoted to them such spare hours as could be snatched from other labours. The present list is therefore based mainly on my own observations; whereas a list of Macro-lepidoptera would have been to a far greater extent a compilation based on the work of others. Moreover, the Macro-lepidoptera have unfortunately acquired a commercial value, and any entomologist worthy of the name hesitates to disclose information concerning them, lest he should unwittingly encourage the plundering of our countryside by professional collectors and their helpers; but with the Micro-lepidoptera, for the most part, this danger is negligible. It remains open to some entomologist better qualified than myself to compile a list of Macro-lepidoptera on a similar scale, but perhaps more cautiously worded, and so complete the task here left unfinished.

No satisfactory list of the Micro-lepidoptera of the Oxford district has hitherto been put together. The list of Lepidoptera printed in the Report of the Ashmolean Society for 1901 is a bare string of names, extremely incomplete and sometimes erroneous. The Berkshire list, published in 1906 in the Victoria County History, added hardly any fresh records from the Oxford district. The Oxfordshire list, prepared about the same time for publication in the same series, has never

been printed, and was not compiled under favourable conditions. The region of which Oxford is the centre deserves for many reasons to have its insect fauna fully chronicled. It has obvious limitations, being far from the coast, without mountainous or upland country, including no extensive heaths, moors or pine-woods, and only slight relics of fenland. The plants which require such habitats, and consequently the insects attached to them, are absent or very rare. Nevertheless, it is an area possessing a certain unity and definite characteristics, and may be regarded as a favourable specimen of the more low-lying parts of the southern midlands. Its flora is rich and varied, including many local plants, and the Micro-lepidoptera in consequence are well represented and abundant. Since 1914 a series of papers by the present writer, published for the most part in the 'Entomologist's Monthly Magazine,' has dealt in some detail with the more interesting species observed in the district. A general survey of the Micro-lepidoptera of the Oxford district was published in 1926 in the handbook presented to members of the British Association. To that survey, which makes it possible to confine these remarks to a few indispensable explanations, the present list forms a natural complement.

No moment could be more suitable than the present for the production of this list. On the one hand the character of the Oxford country is rapidly changing. Almost every year one or more of the most interesting localities falls a prey to the builder, the farmer, the grower of live-stock, or the golfer. Rough banks and ditches are transformed into tidy paths, barbed-wire fences spring up on ground always hitherto open, ancient woodland is replaced by fir plantations. Local plants are uprooted, burnt or otherwise destroyed. Many interesting insects are therefore on the point of extinction, if not already extinguished. It is very desirable to put on record, before the opportunity has passed, some account of the entomological resources of the Oxford district in what will soon be looked back upon as the 'good old days.' On the other hand, several collections of Micro-lepidoptera formed to a large extent within the area have lately come into the possession of the University Museum. It was important to examine them and record the more interesting of their contents before they were incorporated and while doubtful data could still be verified. Having had the advantage of utilising virtually all the existing material, both specimens and written records, I have tried to settle all outstanding problems and clear the field for future observers. Finally, the appearance in the course of 1928 of two

eagerly awaited works provided me most opportunely with a solid basis in matters of classification and nomenclature. Mr. Meyrick's 'Revised Handbook of British Lepidoptera,' by the chief living authority on the Micro-lepidoptera, has at last provided a really satisfactory classification of the smaller moths; I have followed implicitly both its arrangement and (with a few insignificant exceptions) its nomenclature. The new 'Flora of Oxfordshire' by our distinguished Treasurer, Dr. G. C. Druce, has served as an authoritative and up-to-date guide in the thorny questions of botanical nomenclature.

It is obvious that a list of this kind must be very imperfect. An observer whose time is limited inevitably concentrates his attention upon a small number of familiar localities. In order that it may have some permanent value, in spite of its incompleteness, special efforts have been made to ensure the reliability of all the information given. In the large majority of instances, the records are based on the specimens themselves and the data attached to them, the identity of each example having been carefully verified at the outset. No account has been taken of specimens lacking data, while the data themselves have been controlled, whenever there was any possibility of error, by entries in entomological diaries. My own collection and diary, dating from 1908 (so far as the Oxford district is concerned), but furnishing hardly any records of the smaller moths prior to 1911, have naturally formed the basis of the list. In addition, I have worked through the collections housed in the Hope Department, including those formed by Messrs. A. Sidgwick, N. V. Sidgwick, W. G. Pogson-Smith and Prof. W. M. Geldart, and the entomological diaries relating to them. Most of the Oxford district specimens in these collections bear the inadequate and often misleading label 'Oxford,' with the date of capture; but by consulting the diaries at the date indicated I have usually been able to determine the actual locality, and often the circumstances, in which they were obtained. Mr. A. H. Hamm has allowed me to examine a small but interesting accumulation of Micro-lepidoptera, picked up from time to time in the course of his search for other insects. Exceptionally I have included in the list a small number of records, about which no doubt was possible, culled from diaries and unsupported by specimens, and a few others supplied to me by trustworthy collaborators, notably Prof. A. W. Pickard-Cambridge, Mr. O. W. Richards and Commander J. J. Walker. But every record accepted without an examination of the actual specimen or material on which it is based has been distinguished by a special sign.

As in the 1901 list, the term 'Oxford district' has been taken to mean the country lying within a radius of ten miles from Carfax. In reality, a seven-mile radius could have been adopted without materially altering the present list, all the more productive localities lying close at hand; but the ten-mile radius, while not seriously infringing the natural unity of the district, allows more scope for future additions. A few records of special interest from spots outside the radius have been included, but are enclosed in square brackets. In mentioning localities, the general principle has been to work from south-west to north-east, but to deal successively with the three counties, Berkshire, Oxfordshire and Buckinghamshire. Dates have been given in the case of the older records, the rarer species and isolated occurrences of the commoner species, and an attempt has been made to indicate, so far as possible, the quantity observed of each species. Finally, in view of the fact that most Micro-lepidoptera are dependent on some particular plant or plants, it has been deemed important to mention the plants to which each species is known to be attached in this district. Such information has only been given when there was definite evidence available, and is therefore very incomplete, especially for the larger insects; but it seemed best to follow the same system throughout, if only to indicate how much remains to be known.

In the course of my task I have been obliged to invoke the assistance, and probably try the patience, of many kind friends. My thanks are due, and are warmly offered, to Mr. E. Meyrick for identifying numerous specimens and discussing difficulties of nomenclature; to Mr. W. G. Sheldon for identifying various Tortricids, especially the aberrations of species of *Peronea*; to Mr. O. W. Richards for examining the genitalia of a large number of specimens, especially of the genus *Coleophora*, and supplying particulars of his own captures; to Mr. W. Petersen for examining the genitalia of several species of *Lithocolletis* and *Nepticula*; to Prof. A. W. Pickard-Cambridge for sending me a list of captures and answering my queries; to Mr. N. V. Sidgwick for enabling me to examine his collection and entomological diary (both now presented to the University Museum) and for information communicated verbally; to Mrs. W. M. Geldart and Mrs. W. G. Pogson-Smith for allowing me to consult entomological diaries written by their late husbands; to the Proprietor of the Victoria County History and to the General Editor (Wm. Page, Esq., F.S.A.) for generously placing at my disposal the manuscript list of Oxfordshire Lepidoptera in their possession; to Mr. A. H. Hamm for handing over to me or permitting me to examine much useful material

and for many hints and items of information; to Dr. G. C. Druce and Mr. T. R. Gambier-Parry for assistance in the identification of plants; to Prof. E. B. Poulton for allowing me unrestricted access to the collections in the Hope Department; to Commander J. J. Walker for information supplied, and for supervising with an experienced eye the production of this list; and to my wife for undertaking the heavy task of preparing the list for the printer.

The following manuscript sources and publications have been utilised in the compilation of the list, in addition to my own material. Before each item is placed the short title used for reference :—

MANUSCRIPT SOURCES.

- A. S. diary.** An entomological diary kept by A. Sidgwick, 1887—1911; in four note-books, now in the Hope Department.
- N.V.S. diary.** An entomological diary kept by N. V. Sidgwick, 1880—1906; hardly concerned with the Oxford district until 1896; in two note-books, now in the Hope Department.
- W.C.P.-S. diary.** An entomological calendar kept (intermittently) by W. G. Pogson-Smith, 1896—1903; in one note-book.
- W.M.G. diary.** An entomological diary kept by W. M. Geldart, 1902—1912; in two note-books, the second of which is in the Hope Department.
- Oxfordshire list.** A list of the Lepidoptera of Oxfordshire, compiled about 1905 for the Victoria County History of Oxfordshire by A. H. Hamm and W. Holland.

PUBLICATIONS.

- Nat. Hist. Tin.** H. T. Stainton, *The Natural History of the Tineina*, 13 vols, London, 1855—1873.
- Stainton's Manual.** H. T. Stainton, *A Manual of British Butterflies and Moths*, Vol. II, London, 1859.
- Wilkinson.** S. J. Wilkinson, *The British Tortrices*, London, 1859.
- Staudinger-Rebel.** O. Staudinger und H. Rebel, *Catalog der Lepidopteren des palaearctischen Faunengebietes*, third edition, Berlin, 1901, Part II.

- 1901 list.** [A. Sidgwick] Lepidoptera of the Oxford District, in the Ashmolean Natural History Society of Oxfordshire Report for Year 1901, Oxford, 1902, pp. 16-31.
- Barrett.** C. G. Barrett, The Lepidoptera of the British Islands, Vols. IX, X, XI, London, 1904, 1905, 1907.
- Berkshire list.** [W. Holland and A. H. Hamm] Lepidoptera, in A History of Berkshire, edited by P. H. Ditchfield and W. Page (The Victoria History of the Counties of England), Vol. I, London, 1906, pp. 100-116.
- Nat. Hist. Ox.** E. G. R. Waters, Micro-lepidoptera, in The Natural History of the Oxford District, edited by J. J. Walker, Oxford, 1926, pp. 230-247.
- Meyrick's Handbook.** E. Meyrick, A Revised Handbook of British Lepidoptera, London [1928].
- Entom.** The Entomologist. An Illustrated Monthly Journal of General Entomology. London, from 1864.
- Ent. Mo. Mag.** The Entomologist's Monthly Magazine. London, from 1864.

Specimens and records other than my own are assigned in every instance to the captor or observer to whom they are due. The initials are to be interpreted as follows :—

A.H.H.	A. H. Hamm.
A.S.	A. Sidgwick († 1920).
A.W.P.-C.	(Professor) A. W. Pickard-Cambridge.
E.B.P.	(Professor) E. B. Poulton.
H.A.P.	(Rev.) H. Adair Pickard.
J.C.	J. Collins.
J.J.W.	(Commander) J. J. Walker.
N.V.S.	N. V. Sidgwick.
O.W.R.	O. W. Richards.
W.F.	W. Fassnidge.
W.G.P.-S.	W. G. Pogson-Smith († 1907).
W.H.	W. Holland.
W.M.G.	(Professor) W. M. Geldart († 1922).

The following signs are used :—

- * Found in the larval or pupal stage and reared.
- ** Identified from the larva, larval case, mine, or other pre-imaginal evidence, but not actually reared.
- † I have not examined the specimen or material on which the record is based.
- [] Outside the ten-mile radius.

PYRALIDINA.

PHYCITIDAE.

Pempelia dilutella Hübn. Wytham Hill. On the south side of Stow Wood. Very local.

Salebria fusca Haw. North Oxford: an example of this species, in fresh condition, came into my study on August 7th, 1926. [Wallingford, one specimen, now in the Hope Department, captured by H. R. Smith in 1894.] The occurrence of this heath-frequenting insect in localities so unsuitable is difficult to explain; perhaps due to accidental introduction?

S. betulae Göze. Cothill. Boar's Hill. Hen Wood, several at light, 1899 and 1901 (A.S., N.V.S.); larvae and pupae found in 1923. Waterperry Wood. Shabbington Wood. The moth itself is not often captured, but the larvae are fairly common. On *Betula alba*.*

Alispa angustella Hübn. Near Dry Sandford, larvae found in hedges, 1919-20. Bagley Wood, larvae plentiful on one tree, September and October, 1921. Wytham Hill, one on June 10th, 1911; traces of larvae seen there subsequently. On *Euonymus europaeus*.* The moth is very seldom captured.

Hypochalcia ahenella Hübn. Holton Pits, one captured on June 27th, 1924.

Dioryctria abietella Fabr. Tubney Warren, one captured on August 9th, 1920.

Phycita spissicella Fabr. Tubney Wood. Boar's Hill and Bagley Wood. Wytham Woods. Yarnton, one in 1922. Waterperry Wood. Hell Coppice. Shabbington Wood. Rather common in oak woods.

Ephestia elutella Hübn. North Hinksey, in a rick, 1913. Oxford, common in shops and dwelling-houses. Headington Hill, on a fence, 1922.

E. kuehniella Zell. Oxford: plentiful in the Castle Mill and in grain shops. Bred from oatcake and biscuit, 1897-99 (A.S.).

Cateremna terebrella Zinck. Tubney Wood, since 1920. Hitch Copse, since 1915. Bagley Wood, since 1921. Bladon Heath, larvae found in April, 1915. Obtained

only in the larval stage, in stunted cones of *Pinus Abies** fallen from the larger trees. Irregular in its occurrence, but turns up repeatedly in different spots, often in plenty. Cf. Ent. Mo. Mag., LVI, 1920, p. 258.

Homoeosoma binaevella Hübn. Boar's Hill, a few captured in 1901 (A.S., N.V.S.). Oxford district, one specimen labelled 1910 (in error for 1901?) (W.G.P.-S.).

H. nebulella Hübn. [Cherbury Camp, one in 1920.] Tubney, one in 1920. Boar's Hill, 1899 and 1901, many specimens (A.S., N.V.S., W.G.P.-S., W.M.G.). [Cornbury Park, 1899 (A.H.H.).] Otmoor, one in 1928.

Myelois cribrella Hübn. [Cherbury Camp, 1920.] Tubney, frequent (J.J.W.). Between Boar's Hill and South Hinksey, plentiful in various spots. North Hinksey. By the Canal north of Wolvercote. North Oxford, on street-lamps. Headington, one in 1902 (A.H.H.); many in 1905 (N.V.S.). In and around Bullingdon Bog (A.H.H.).† Holton Pits, one in 1925. A common insect in this district. On *Cirsium eriophorum*,* *C. lanceolatum** and *Arctium Lappa*.* Cf. Ent. Mo. Mag., LIX, 1923, p. 182.

Eurhodope advenella Zinck. Tubney, one in 1920. Hen Wood, at light, 1899-1902 (A.S., N.V.S.). Boar's Hill and Chilswell, in hedges. Bagley Wood, one in 1920. Wytham Hill. Marston fields, 1890 (A.S.). Marston, one in a garden hedge, 1920. Hell Coppice. Widely distributed, but occurs sparingly.

E. suavella Zinck. Hen Wood, several captured at light, 1899 and 1901 (A.S., N.V.S.). Hell Coppice, locally common. On *Prunus spinosa*.*

Cryptoblabes bistriga Haw. Cothill, one larva in 1928. Hen Wood, 1893 and 1901 (A.S.). Bagley Wood, sometimes abundant in the larval stage, though the imago is less in evidence. On *Quercus Robur*.*

Acrobasis consociella Hübn. Common in all the woods of the district. On *Quercus Robur*.*

A. Zelleri Rag. Common in oak woods, sometimes very abundant. On *Quercus Robur*.*

CALLERIADAE.

Meliphora grisella Fabr. Many 'Oxford district' specimens, bred in 1906, in the Sidgwick collections. North Oxford, one at light, 1907 (A.S. diary).† Summertown, many bred from old honeycomb from the hives of Mr. H. R. Best, 1914 (J.J.W.).

Aphomia sociella Linn. Hen Wood, 1897 and 1901 (A.S., N.V.S.). Oxford, common. Headington Hill, on a fence, 1920. Bullingdon Bog, 1906 (A.H.H.).

Galleria mellonella Linn. Summertown, bred in plenty from old honeycomb from the hives of Mr. H. R. Best, 1914 (J.J.W.). Ifley, one on a tree trunk in a garden, 1906 (A.H.H.).

CRAMBIDAE.

Crambus uliginosellus Zell. Cothill (J.J.W.).† Boar's Hill. Marston fields, one in 1899 (N.V.S.). Bullingdon Bog, plentiful. On marshy ground.

C. pascuellus Linn. Common.

C. pratellus Linn. Common.

C. culmellus Linn. Very common.

C. hortuellus Hübn. Very common.

[**C. chrysonuchellus** Scop. Cornbury Park, near Charlbury, found commonly* on June 18th, 1899 (A.H.H.).]

C. falsellus Schiff. Hen Wood, at light, 1897, 1901 (A.S.). South Hinksey, one in thatch, 1913. Summertown, occasionally comes indoors (J.J.W.).

C. pinellus Linn. Tubney, on flowers of ragwort at night. Cothill, 1920. Foxcombe Hill, 1922. Boar's Hill and Hen Wood, many specimens, from 1890 onwards (A.S., N.V.S.); one in the Youlbury grounds, 1928. Bagley Wood, 1898 (N.V.S. diary).† Bladon Heath, 1927. Frequents sandy localities.

C. perlellus Scop. Common.

C. inquinatellus Schiff. Tubney. Boar's Hill and Hen Wood. Cumnor Hurst. North Oxford. The University Parks (A.H.H.).† Commonest in sandy localities.

C. geniculatus Haw. Tubney, common. Foxcombe Hill. Hen Wood, 1899 (N.V.S.). Cumnor Hurst. Wytham Hill. North Hinksey. Oxford, at light, 1898-99 (A.S.); in the University Parks (A.H.H.).† Shotover (A.H.H.).

C. tristellus Fabr. Common.

C. selasellus Hübn. Cothill. Binsey. Yarnton, 1922. Oxford, one attracted to light, 1924. Marston fields, 1898-1902 (A.S., N.V.S., W.M.G.). Bullingdon Bog, 1900 (A.S. and N.V.S. diaries).† Otmoor. Local, in wet meadows and along ditches.

PYRAUSTIDAE.

Acentropus niveus Ol. On the Thames at Binsey, 1924 (O.W.R.).† On the Cherwell near Marston Ferry, one male dated August, 1899 (A.H.H.). Oxford district, one male specimen dated July, 1897 (W.G.P.-S.).

- Schoenobius forficellus** Thunb. Hen Wood, one female at light, 1901 (A.S.). Binsey: common in a wet ditch by the Upper River. Oxford: by the Canal.
- Donacaula mucronella** Schiff. The Canal near Yarnton, abundant in 1913. Marston fields, many specimens dated 1898-1900 (A.S., N.V.S., W.G.P.-S., W.M.G.).
- Cataclysta lemnata** Linn. Binsey: in a wet ditch by the Upper River. Marston fields, from 1894 (A.S.). Locally common.
- Nymphula stagnata** Don. Hen Wood, at light, 1901 (A.S. and N.V.S. diaries).† Binsey. The Canal. Marston fields, from 1899 (A.S.). Otmoor. Locally common, in wet ditches and slow-running streams.
- N. stratiotata** Linn. Cothill. The Canal between Yarnton and Oxford. North Oxford, frequent on street-lamps. Marston fields, from 1890 (A.S., W.M.G.). Locally common.
- Hydrocampa nymphaeata** Linn. Cothill. Binsey. The Canal. Marston fields, from 1890 (A.S., W.M.G.). Otmoor. In ponds, wet ditches and semi-stagnant streams; rather common.
- Notarcha ruralis** Scop. Common.
- Eurrhyncha urticata** Linn. Common.
- Perinephela lancealis** Schiff. Tubney, 1911. Cothill, locally common among *Eupatorium cannabinum*.
- Phlyctaenia crocealis** Hübn. Cothill. Hen Wood, 1899 (A.S.). Wytham Woods, among *Inula Conyza*. South Hinksey. Yarnton. Polecat End Lane near Forest Hill. Otmoor. Hell Coppice. Common among *Pulicaria dysenterica*.
- P. lutealis** Hübn. Common.
- P. ferrugalis** Hübn. Common in some years, absent in others.
- P. prunalis** Schiff. Common. On *Anthriscus sylvestris*,* etc.
- P. fuscalis** Schiff. Waterperry Wood, locally common among *Melampyrum pratense*.
- P. sambucalis** Schiff. Common.
- Nomophila noctuella** Schiff. Irregular in occurrence, but often common.
- Pyrausta nigrata** Scop. Wytham Hill (J.J.W.). Holton Pits. On calcareous soil, very local.
- P. purpuralis** Linn. Common.

- P. aurata** Scop. Cothill, locally common on marshy ground among *Lamiaceae*.
- P. cespitalis** Schiff. Common.
- P. olivalis** Schiff. Common. On *Eupatorium cannabinum*,* etc.
- Loxostege verticalis** Linn. Boar's Hill and Hen Wood, frequent (A.S., N.V.S.). Bagley Wood, 1895-96 (A.S.). Radley, one in 1919. Culham, one in 1919 (A.H.H.). Oxford, 1889 and 1890 (A.S. diary)†; occasionally comes to light. Marston, one in 1906 (A.S.).
- Scoparia angustea** Steph. Bagley Wood, 1921. Wytham, in a rick, 1919. Bladon Heath, 1927. Wolvercote. Oxford, common on walls and fences. Headington. Holton, in thatch, 1927. One of the most familiar Oxford insects, found in every month of the year.
- S. frequentella** Staint. Common.
- S. crataegella** Hübn. Bagley Wood, locally abundant on oak-trunks. Godstow Holt. North Oxford, 1927.
- S. truncicolella** Staint. Tubney Wood. Cothill, 1922. Bagley Wood. Waterperry Wood. Locally abundant in woods. Larva on moss growing on the ground.*
- S. pallida** Steph. Cothill. The Canal from Yarnton to Oxford. Bullingdon Bog, 1904 (W.M.G.). Locally common in marshy places.
- S. cembrae** Haw. Hen Wood, 1901 (A.S.). Bagley Wood, 1913. North Hinksey. Oxford, on a street-lamp, 1920. Summertown, found indoors (J.J.W.).
- S. dubitalis** Hübn. Common. Var. **purbeckensis** Banks (or a form closely approaching it): one on a sycamore trunk in Tubney Wood, June 20th, 1924.
- S. ambigualis** Treits. Common. Abounds in woods on oak trunks.
- Mesographe forficalis** Linn. Common.

PYRALIDIDAE.

- Endotricha flammealis** Schiff. Hen Wood, several captured at sugar on July 22nd, 1901 (N.V.S.).
- Pyralis glaucinalis** Linn. Hen Wood, several captured at light and sugar in July, 1901 (A.S., N.V.S.). Summertown, in a house (J.J.W.).† Oxford district, two specimens dated 1898 and 1900 (W.G.P.-S.).

- P. costalis** Fabr. Tubney, 1927. Cothill. Bagley Wood, not uncommon in 1922. North Oxford and Summertown, sometimes attracted to light. Headington Hill, on a fence, 1920. Usually found in or near outbuildings, but the Bagley locality is far from any habitation.
- P. farinalis** Linn. Hen Wood, at sugar, 1906 (A.S. diary). † Bagley Wood, 1888 (A.S. diary). † Oxford, found indoors or resting on walls, 1898 (A.S.), 1901 (A.H.H.), 1906 (A. J. Chitty); in the Castle Mill, 1915. Not common.
- P. lienigialis** Zell. Oxford is one of the few British localities for this rarity. A specimen taken 'near Oxford,' August 22nd, 1902, was exhibited by Mr. South at a meeting of the South London Entomological Society the same year (cf. Ent. Mo. Mag., XXXVIII, 1902, p. 273, and Entom., XL, 1907, p. 291). Commander J. J. Walker captured a specimen in his bedroom at Summertown in early August, 1906, and a second in the first week of August, 1907 (cf. Ent. Mo. Mag., XLIV, 1908, p. 16). On July 5th, 1911, he met with a third example, resting on the stone wall of a barn at Lower Wolvercote (cf. Ent. Mo. Mag., XLVII, 1911, p. 192). Another was taken in August, 1907, in North Oxford by the Rev. W. Mansell Merry (cf. Ent. Mo. Mag., XLIV, 1908, p. 17). My own specimen, found resting on a telegraph pole by the Canal between Wolvercote and Oxford, on May 9th, 1912, seems to be the most recent capture.
- Aglossa pinguinalis** Linn. Cothill, in an outhouse, 1927. Hen Wood, several captured at light, 1897 and 1899 (A.S., N.V.S.). Oxford, frequent in houses. In the University Museum, not uncommon (A.H.H.).

PTEROPHORIDAE.

- Oxyptilus heterodactylus** Vill. Boar's Hill: in the Youlbury grounds and above Chilswell. Cumnor Hurst. Bagley Wood, one in 1920. Locally common among *Teucrium Scorodonia*.
- Platyptilia acanthodactyla** Hübn. South Hinksey: one in the old Rifle Range, August 17th, 1920. Oxford: one captured in the University Museum by A. Robinson, November 1st, 1904. Rare in this district.
- P. gonodactyla** Schiff. Foxcombe Hill, 1899 (W.H.). Boar's Hill, 1898 (A.H.H.). Kennington, 1925. North Hinksey, in a stone-pit. South Hinksey. North Oxford, on waste ground. Kirtlington, 1925 (O.W.R.). Bullingdon Bog, 1905 (W.M.G. diary). † Among *Tussilago Farfara*, locally common.

- P. pallidactyla** Haw. Foxcombe Hill, Boar's Hill and Hen Wood. North Hinksey. Oxford. Shotover, 1889 (A.S. diary).† Frequent on waste ground, and comes to light.
- Alucita tetradactyla** Linn. Figures in the 1901 list, but no specimen supporting the record has been traced. On the south side of Stow Wood, very local. Oxford district, one specimen dated July 7th, 1911, in the Pogson-Smith collection.
- A. pentadactyla** Linn. Common.
- A. galactodactyla** Hübn. Cothill. Hen Wood, 1898 (W.G.P.-S.). Bagley Wood. Wytham Woods. Larvae plentiful in woods on *Arctium Lappa*.* The moth is seldom seen in the open, but flies at night.
- Adania microdactyla** Hübn. Tubney. Cothill. Bagley Wood, many captured in 1901 (W.G.P.-S.). South Hinksey: in the old Rifle Range. Locally plentiful. Larvae in stems of *Eupatorium cannabinum*.*
- Pterophorus lienigianus** Zell. In a lane between Bessels Leigh and Hen Wood, larvae common, 1914. Headington Quarry, larvae and pupae, 1928 (W.F.).† On *Artemisia vulgaris*.*
- P. lithodactylus** Treits. Cothill. Hen Wood, 1901 (A.S.). South Hinksey: in the old Rifle Range. Bladon Heath, 1927. Near Forest Hill: in Polecat End Lane. Hell Coppice. Among *Pulicaria dysenterica*.
- P. monodactylus** Linn. Common.
- Marasmarcha phaeodactyla** Hübn. Boar's Hill, 1899-1904 (A.S., N.V.S., W.M.G.). Cumnor Hill, 1906 (A.S. and N.V.S. diaries).† South Hinksey: in the Happy Valley. Headington, in a quarry, 1905 (N.V.S. and W.M.G. diaries).† Very local, but occurs in plenty among *Ononis*.
- Stenoptilia zophodactyla** Dup. On the south side of Stow Wood, one captured on June 27th, 1924, among *Centaurium Centaurium*.
- S. bipunctidactyla** Haw. Tubney. Cothill. Bagley Wood and Kennington. North and South Hinksey. Waterperry Wood. Hell Coppice. Rather common in woods and meadows. On *Scabiosa Succisa*.*
- S. pterodactyla** Linn. Common.

TORTRICINA.

PHALONIADAE.

- Lozopera francillana** Fabr. Hen Wood, two specimens captured at light, 1899 and 1901 (A.S.). Near Forest Hill: one captured in a meadow by Holton Brook, July 21st, 1921. Remarkably scarce in this district.
- L. dilucidana** Steph. Near Cumnor: in a stone-pit on the Tubney road, and in the Chawley brick-yard. Kennington, 1920. North Hinksey, in a stone-pit. Headington, in a quarry, 1905 (N.V.S.). Bullingdon Bog, 1925. Holton Pits. Locally plentiful. On *Peucedanum sativum*.*
- Phalonia zephyrana** Treits. Yarnton, on a railway embankment, infrequent.
- P. smeathmanniana** Fabr. Sunningwell, one on August 16th, 1915. Boar's Hill, 1897 and 1899 (A.S.), 1902 (N.V.S.), 1904 (W.M.G.). South Hinksey: in the Happy Valley, a few in 1913. Yarnton railway embankment, one in 1912. Shotover, one in 1902 (W.H.). Scarce, but widely distributed.
- P. badiana** Hübn. Tubney, locally common. Cothill, 1925. Cumnor, in a stone-pit, 1925. Boar's Hill, one in 1897 (A.S.). On *Arctium Lappa*.*
- P. cnicana** Doubl. Cothill. Hen Wood and Youlbury, 1899 (A.S., E.B.P.). South Hinksey. Bullingdon Bog. Waterperry Wood. Hell Coppice. Locally common in meadows and woods among *Cirsium palustre*.
- P. tesserana** Treits. South Hinksey: in the Happy Valley, two captured in 1899 (W.G.P.-S.); plentiful there in 1912.
- P. luridana** Gregs. Kennington, several captured and others seen on June 28th, 1925. Bullingdon Bog, one on June 25th, 1925.
- P. manniana** Fisch. v. Rösl. Tubney. Cothill. Foxcombe Hill, one in 1921. South Hinksey. Binsey. In marshy places, scarce except at Cothill.
- P. alismana** Rag. Binsey: in a ditch by the tow-path, and commonly in 1922 on a mud-patch by the Hinksey Stream. Between Wolvercote and Yarnton, one in 1912. Otmoor, one in 1928.

- P. rupicola** Curt. Tubney. Cothill. South Hinksey: in the old Rifle Range. Locally common among *Eupatorium cannabinum*.
- P. implicitana** Wocke. Sunningwell, one in 1915. Boar's Hill: several captured on the wing at night, in a fallow field among *Matricaria*, July, 1922.
- P. roseana** Haw. Boar's Hill, 1899 and 1902 (W.G.P.-S.). Wytham Hill, 1913-14. Very local and irregular, but plentiful when it occurs, among *Dipsacus sylvestris*.
- P. ciliella** Hübn. Chawley, 1911. Between Godstow and Eynsham, 1902 (N.V.S., W.M.G.). Bladon Heath. Yarnton railway embankment. Elsfield, 1906 (N.V.S., W.M.G.). Hell Coppice, 1921. Rather common among cowslip.
- P. flaviciliaria** Wilk. This beautiful insect was found commonly in a locality at Kennington in June and July, 1925, among *Scabiosa arvensis*. It was still there in 1927, though in danger of extinction.
- P. nana** Haw. Cothill. Hen Wood. Boar's Hill: above Chilswell. Waterperry Wood. Shabbington Wood, 1921. Frequent among birch.
- P. dubitana** Hübn. Tubney: in sandy fields on the outskirts of the wood. Foxcombe Hill, common in 1915 among *Senecio Jacobaea*.
- P. hybridella** Hübn. South Hinksey: one captured in the Happy Valley, August 16th, 1913.
- Chlidonia baumanniana** Schiff. Tubney. Cothill. Bagley Wood. Hell Coppice. Locally common in meadows and woods, among *Scabiosa Succisa*.
- Phtheochroa rugosana** Hübn. Tubney, one in 1913. Hen Wood, at light, 1903 and 1906 (A.S., N.V.S.). Near Wolvercote: one on the Canal Bank, 1901 (W.H.). Oxford, one in 1892 (A.S.); occasionally found flying on waste ground and resting on fences. Bullingdon Bog, one in 1918 (A.H.H.).
- P. maculosana** Haw. Tubney Wood. Hitch Copse. Hen Wood, 1897 (A.S.), 1899 (A.H.H.). Bagley Wood. South Hinksey. Wytham, 1899 (A.W.P.-C.). Shotover. Waterperry Wood. Frequent and sometimes common among *Scilla nonscripta*.
- Euxanthia angustana** Hübn. Generally distributed and rather common, on dry flowery road-sides and waste ground.

- E. straminea** Haw. Bagley Wood, one in 1898 (A.S.). South Hinksey, two in 1912. Yarnton railway embankment, one in 1912. By the Canal near Wolvercote, one in 1899 (A.H.H.).
- E. zoegana** Linn. Boar's Hill and Hen Wood, frequent, from 1895 (A.S.). Binsey: one in a meadow by the church, 1922. Marston, 1894 (A.S.), 1899 (N.V.S.). Ab. **ferrugana** Haw. (cf. Wilkinson, p. 317; Barrett, X, p. 340): one captured at Boar's Hill, July 10th, 1904 (W.M.G.).
- E. hamana** Linn. Common in waste places and in fallow or badly cultivated fields, among thistles.
- Hysterosia inopiana** Haw. Cothill. Boar's Hill, 1900-01 (A.S., N.V.S., W.G.P.-S.). South Hinksey. Binsey, 1925. Beckley, 1928. Otmoor, 1928. Among *Pulicaria dysenterica*.

TORTRICIDAE.

- Batodes angustiorana** Haw. Cothill. Bagley Wood. Oxford, abundant in gardens and shrubberies. Headington Hill, on fences. On *Taxus baccata* (W.G.P.-S., 1899), etc.
- Capua favillaceana** Hübn. Cothill, 1922. Boar's Hill. Bagley Wood. Bladon Heath, one in 1912. Scarce except in the Boar's Hill and Bagley Wood area. Usually found among hazel.
- C. grotiana** Fabr. Hen Wood, many captured in 1899 and 1901 (A.S., N.V.S.). Bagley Wood, not uncommon, 1899 and 1901 (W.M.G.), 1919, 1922. Often comes to sugar.
- Cacoecia podana** Scop. Common. Ab. **sauberiana** Sorh. (cf. Staudinger-Rebel, 1507a): one captured at Boar's Hill, June, 1896 (N.V.S.); one 'Oxford district' specimen, dated July 1st, 1904, in the Geldart collection; one captured in my study in North Oxford, July 20th, 1922. Polyphagous.
- C. crataegana** Hübn. Bagley Wood. Waterperry Wood. Shabbington Wood, 1928. Not uncommon in the two former localities.
- C. xylosteara** Linn. Cothill. Boar's Hill. Bagley Wood. North Hinksey. Oxford, at light, 1898 (A.H.H.). Holton Pits. Hell Coppice. Rather common. On *Betula alba*,* *Populus canescens*,* etc.
- C. rosana** Linn. Common. On *Prunus spinosa*,* *Salix viminalis*,* etc.

- C. sorbiana** Hübn. Cothill. Bagley Wood. Water Eaton, 1924. Waterperry Wood. Common among oaks.
- C. lecheana** Linn. Common in all woods. Polyphagous.
- Pandemis corylana** Fabr. Rather common in all the woods of the district. In the Geldart collection is a handsome example, captured in late August, 1904, in Bagley Wood, of the variety having no markings except for darker terminal cilia (cf. Barrett, X, p.172).
- P. cinnamomeana** Treits. Boar's Hill, many captured in 1897 and 1899 (A.S., N.V.S.). Bagley Wood, two in a fir plantation, 1924.
- P. heparana** Schiff. Common. On *Pyrus Malus*,* *Salix viminalis*,* etc.
- P. ribeana** Hübn. Very common; especially among oaks, but polyphagous.
- Tortrix loeflingiana** Linn. Common. On *Quercus Robur*.*
- T. viridana** Linn. Common everywhere among oaks, sometimes extremely abundant in the principal woods. On *Quercus Robur**; exceptionally on *Salix viminalis*,* Wol-
vercote, 1926.
- [**T. paleana** Hübn. Cherbury Camp, one on July 17th, 1920.]
- T. forsterana** Fabr. Hen Wood, 1896 (N.V.S. diary).† Oxford, common in gardens, feeding especially on ivy.
- T. costana** Fabr. Binsey. The Canal from Yarnton to Oxford. Oxford: frequent by the Cherwell (A.S.). Marston Ferry, Kirtlington, 1927 (O.W.R.).† Local, found only near water. On *Glyceria aquatica*,* *Epilobium hirsutum*,* *Salix viminalis*,* *Urtica dioica** (O.W.R.), *Scrophularia aquatica** (O.W.R.).
- T. unifasciana** Dup. Common, especially in gardens.
- T. diversana** Hübn. Shabbington Wood, one on July 19th, 1928. Oxford district, two specimens dated July 22nd, 1901 (W.G.P.-S.).
- T. musculana** Hübn. Common.
- Eulia ministrana** Linn. Common.
- Tortricodes tortricella** Hübn. Very common in woods and copses. On *Quercus Robur*.*
- Cnephasia osseana** Scop. [Cherbury Camp, common, 1920.] Oxford district, one specimen dated August 1st, 1896 (A.S.).
- C. longana** Haw. Boar's Hill. Radley, in river meadows, 1919. North Hinksey. New Hinksey, 1925. Binsey, 1913. Yarnton. East Oxford, one in 1911 (A.H.H.). Marston fields, 1899 (N.V.S.), 1900 (W.G.P.-S.). Locally common.

- C. incanana** Steph. Tubney Wood, one in 1925. Hen Wood, many specimens dated 1897-1901 (A.S., N.V.S.). Bagley Wood, frequent. Wytham Woods, one in 1914. On *Scilla nonscripta*.*
- C. virgaureana** Treits. Very common. Larvae found on a great variety of plants.
- C. communana** Herr.-Schäff. Cothill, several in 1912. Kennington, seen in 1921. Oxford district, several specimens dated 1896-1902 (N.V.S., W.G.P.-S., W.M.G.). Usually mistaken for the following species.
- C. chrysanthemana** Dup. Common.
- C. pascuana** Hübn. Boar's Hill. Kennington. North Hinksey. Godstow Holt. Yarnton. Oxford, at light, 1921. Headington Hill, on a fence, 1924. Widely distributed, but not common.
- C. incertana** Treits. Common.
- C. nubilana** Hübn. Hen Wood, 1903 (N.V.S.). Kennington. North Hinksey. North Oxford, 1902 (W.H.). The University Parks, 1902 (N.V.S. diary).† Hell Coppice. Commoner than these records indicate. On *Crataegus** and *Prunus spinosa*.*
- Isotrias rectifasciana** Haw. Cothill. Hen Wood, 1896-1901 (A.S., N.V.S.). Kennington. North and South Hinksey. Yarnton. Upper Wolvercote. Oxford: in the University Parks. Rather common in hedges.
- Argyrotoxa forskaeana** Linn. Tubney Wood. Cothill. Boar's Hill. Hen Wood, 1901 (N.V.S.). Bagley Wood. Wytham Woods. Marston, 1890 (A.S.), 1898 (N.V.S.). Rather common among sycamore and maple.
- A. bergmanniana** Linn. Common. On *Rosa*.*
- A. conwayana** Fabr. Very common.
- Spatalistis bifasciana** Hübn. Bagley Wood, one captured on the wing, July 19th, 1920.
- Peronea holmiana** Linn. Hen Wood, 1897 (A.S.). Kennington. South Hinksey. Binsey. Yarnton. North Oxford. Shabbington Wood, 1928. Rather common.
- P. caudana** Fabr. Common among willows. Ab. **emargana** Fabr. is frequent.
- P. contaminana** Hübn. Very common. On *Crataegus** and *Prunus spinosa*.* Some interesting varieties occur.
- P. aspersana** Hübn. Cothill. Bagley Wood, 1915. South Hinksey. Hell Coppice. Local, but occurring in both wet and dry localities.

- P. ferrugana** Schiff. Tubney Wood. Cothill. Hen Wood, 1900 (A.S.). Bagley Wood. Fairly common in some woods, but apparently missing from others.
- P. shepherdana** Steph. Twelve 'Oxford district' specimens, all captured on July 30th, 1904, in the Geldart collection; there is no mention of these in the diary of Prof. Geldart, who was away from Oxford at the time. Cothill. South Hinksey: in the old Rifle Range. Yarnton, one on September 2nd, 1924. Weston-on-the-Green, one on September 11th, 1928. Locally common among *Spiraea Ulmaria*. Cf. Ent. Mo. Mag., LXIV, 1928, p. 45.
- P. schalleriana** Linn. and ab. **comparana** Hübn. Rather common. Ab. **perplexana** Barr.: one in Bagley Wood, 1919; one in Hell Coppice, 1925; Oxford district, probably Hen Wood, one in 1891 (A.S.).
- P. logiana** Schiff. Tubney Wood. Cothill. Bagley Wood. Wytham Woods, larva seen in 1928. Locally common. On *Viburnum Lantana*.* The variation, which is more marked in the summer than in the autumn brood, presents no feature of special interest.
- P. variegana** Schiff. Common. On *Rosa**; very troublesome in Oxford gardens. The usual variation occurs. [A white form with only the costal blotch and apex fuscous was captured near Glympton on September 20th, 1920.]
- P. sponsana** Fabr. Tubney Wood. Boar's Hill, 1897-1900 (N.V.S.). Bagley Wood. South Hinksey: above the old Rifle Range. Wytham Woods. Marston, 1900 (N.V.S.). Headington. Shotover, 1898 (A.H.H.). Prattle Wood, 1928. Common among beech; also occurs among *Acer Pseudo-platanus*, and in hedges among *Acer campestre*. The normal form in this district is almost unicolorous grey. An example of the form with whitish ground-colour and a fuscous costal blotch was captured near Marston in 1900 (N.V.S.). In the Pogson-Smith collection is an example of the form with a ferruginous costal blotch, captured in the Oxford district in 1901.
- P. cristana** Fabr. Bagley Wood. [Finstock, 1919.] Holton Wood, one in 1919. Waterperry Wood, one in 1921. Hell Coppice. Sometimes common in the first- and last-mentioned localities. Nearly always found in thickets of *Prunus spinosa*. The following forms of this most variable insect have been noticed:—**P. cristana** Fabr.; ab. **albipunctana** Steph. (one in Bagley Wood, 1919); ab. **nigrocristana** Clark; ab. **unicolorana** Desv. (one at Hell

Coppice, 1921); ab. **subunicolorana** Clark (one at Hell Coppice, 1920); ab. **subvittana** Steph. (one at Hell Coppice, 1928); ab. **chantana** Curt. (Bagley Wood); ab. **postchantana** Webb (one in Bagley Wood, 1919); ab. **spadiceana** Haw.; ab. **vittana** Steph.; ab. **brunneana** Steph.; ab. **substriana** Steph.; ab. **striana** Haw.; ab. **prostriana** Clark (one at Hell Coppice, 1921); ab. **fulvostriana** Desv.; ab. **profanana** Fabr. (Finstock and Hell Coppice); ab. **semiustana** Curt.; ab. **bentleyana** Curt.; ab. **desfontainana** Fabr.; ab. **consimilana** Steph.; ab. **albovittana** Steph.; ab. **fulvocristana** Steph.; ab. **cristalana** Don.; ab. **procristalana** Webb (one in Bagley Wood, 1919); ab. **subcristalana** Curt. (Waterperry Wood and Hell Coppice); ab. **subfulvovittana** Clark. No localities are given for forms found on both sides of the Thames. Cf. Entom. LIX, 1926, p. 25. There is no trace here of the melanic tendency now prevailing in the New Forest and elsewhere.

P. hastiana Linn. Boar's Hill and Foxcombe Hill. Bagley Wood, one in 1900 (A.S.). Yarnton, larvae in 1924-25. North Oxford: one came to the lighted window of my study on February 1st, 1921. Weston-on-the-Green, a larva, 1928. On *Salix viminalis** and *S. cinerea*.* The scarcity of this species in a district which appears so favourable is very remarkable. Only the following forms have been noticed:—ab. **subcristana** Steph. (Yarnton); ab. **autumnana** Hübn. (Yarnton); ab. **transversana** Sheld. (Yarnton); ab. **aquilana** Hübn. (Yarnton); ab. **brunneana** Sheld. (Boar's Hill and Oxford); ab. **albis-triana** Haw. (Weston-on-the-Green); ab. **centrovittana** Steph. (Foxcombe Hill); ab. **flavicostana** Sheld. (Bagley).

P. literana Linn. Tubney Wood. Bagley Wood. Wytham Woods. Waterperry Wood, 1921. Fairly frequent in oak-woods on the Berkshire side of the Thames. No aberration of particular interest has been noticed.

EUCOSMIDAE.

Spilonota ocellana Fabr. Common. On *Pyrus communis** (H.A.P., 1902), *Prunus spinosa**, etc. Var. **lariciana** Zell.: Tubney; Hen Wood, 1903 (N.V.S.); Bagley Wood, 1897-1903 (A.S.); Wytham Woods; among larch.

Acroclita naevana Hübn. Common. On *Crataegus**, etc.

Evetria pinicolana Doubl. Tubney, one in 1925, among *Pinus sylvestris*. Hen Wood, 1897 and 1899 (A.S., N.V.S.). Oxford district, one in 1899 (A.S.); one in 1911 (W.G.P.-S.); one in 1915 (A.H.H.).

- E. buoliana** Schiff. Tubney, rather common in 1915. Hen Wood, 1922. On *Pinus sylvestris*.*
- E. pinivorana** Zell. Tubney, fairly common among *Pinus sylvestris*. Oxford district, one in 1892 (A.S.); one in 1901 (W.G.P.-S.).
- Ancylis lundana** Fabr. Common. On *Vicia Cracca*,* *V. sepium*,** etc.
- A. obtusana** Haw. Tubney Wood. Cothill. Wytham Woods, 1912. Waterperry Wood. Hell Coppice. Shabbington Wood, 1923. Local, but sometimes occurs rather freely.
- A. comptana** Fröl. Wytham Hill, on the Coralline Oolite.
- A. uncana** Hübn. Tubney, one captured on May 30th, 1890 (A.S.). Bagley Wood, one captured on May 20th, 1901 (W.G.P.-S.). There is one other 'Oxford district' specimen, dated August 8th, 1900, in the Pogson-Smith collection.
- A. diminutana** Haw. Tubney Wood, 1913. Cothill. Boar's Hill: in Salter's Wood (i.e. Tommy's Heath), 1895 (A.S.). Hen Wood, one in 1901 (A.S.). Wytham Woods. Waterperry Wood, one in 1921. Local, among fallows.
- A. mitterbacheriana** Schiff. Tubney Wood. Boar's Hill and Hen Wood. Bagley Wood. Wytham Woods. Waterperry Wood. Hell Coppice. Rather common in woods.
- A. lactana** Fabr. Tubney Wood. Cothill. Bagley Wood. Headington Wick, 1896 (A.S.). Waterperry Wood. Locally common. On *Populus tremula*.*
- A. achatana** Fabr. Tubney, 1925. Hen Wood, 1903 (A.S., N.V.S.). Bagley Wood, 1900 and 1902 (W.G.P.-S.). Binsey, 1913. Yarnton, in a hawthorn hedge by the Canal, 1912. Marston, 1903 (A.S. diary).† Hell Coppice, on *Prunus spinosa*.* Not common.
- Gypsonoma aceriana** Dup. Along the Thames between Medley Weir and Godstow. Oxford: in the University Parks. Among poplars.
- G. minutana** Hübn. [Cherbury Camp, one on July 17th, 1920.] Boar's Hill, one on July 15th, 1901 (W.G.P.-S.).
- G. dealbana** Fröl. Very common. On *Quercus Robur** and *Salix viminalis*.*
- G. neglectana** Dup. Hinksey Hill, one on a fence, 1915. By the Thames between Medley Weir and Godstow. North Oxford, on fences. In the University Parks. Among poplars.

- C. oppressana** Treits. Bagley Wood. Godstow Holt. Oxford, two in 1892 (A.S.). Local, on trunks of black poplar.
- Notocelia uddmanniana** Linn. General.
- N. rosaecolana** Doubl. Hen Wood, 1897 (A.S.). South Hinksey. Godstow. Yarnton. Oxford, in gardens and at light. Headington Hill (A.W.P.-C.). Frequent. On *Rosa*.*
- N. trimaculana** Haw. Yarnton, common in a hedge by the Canal. Oxford. Holton Pits, 1924. Hell Coppice. On *Crataegus*.*
- N. roborana** Treits. Bagley Wood. North Hinksey. Binsey, 1913. Oxford, in gardens and at light. Headington Hill (A.W.P.-C.). Waterperry Wood. Otmoor. Common among rose.
- N. tetragonana** Steph. Waterperry Wood, not common, but occurs regularly. Oxford district, one on August 4th, 1890 (A.S.).
- Eucosma albersana** Hübn. Cothill, 1912. Boar's Hill, 1888 (A.S.).† Bagley Wood. Waterperry Wood. Hell Coppice, 1921. Local, in woods.
- E. cruciana** Linn. Cothill. Boar's Hill. Bagley Wood. North Hinksey. Waterperry Wood. Hell Coppice. Shabbington Wood. Rather common. On *Salix*.*
- E. rubiginosana** Herr.-Schäff. Tubney: common in June, 1913, in a plantation among *Pinus sylvestris*; seen again in 1914, but not since.
- E. diniana** Guen. Tubney, one in 1921. Boar's Hill, 1919. Hen Wood, many captured, 1896-1901 (A.S., N.V.S.). Bagley Wood, 1890 (A.S.), 1897 (N.V.S.). Wytham Hill, 1914. Among larch.
- E. ratzeburghiana** Ratz. Headington Hill, one on a fence, July 7th, 1920.
- E. corticana** Hübn. In all woods. Abounds on oak trunks.
- E. trimaculana** Don. Very common. On *Ulmus*.*
- E. signatana** Dougl. Godstow Holt, several examples captured in 1913 and 1914, among *Prunus spinosa*.
- E. nanana** Treits. Tubney. Bagley Wood. Headington Hill, on fences, etc. Locally common among *Pinus Abies*.
- E. pygmaeana** Hübn. Tubney Wood, 1926. Bagley Wood, 1902-05 (W.M.G.); still common there. Bladon Heath. Locally plentiful among *Pinus Abies*.
- E. fractifasciana** Haw. Common in Holton Pits; first noticed there in 1925.

- E. nigromaculana** Haw. Tubney. Boar's Hill. Chawley brick-yard, 1928. Binsey, 1927. On the south side of Stow Wood, 1924. Frequent among *Senecio Jacobaea*, chiefly on sandy soil.
- E. cana** Haw. Common among thistles.
- E. fulvana** Steph. Kennington. North and South Hinksey. Bullingdon Bog. Holton Pits. Rather common among *Centaurea*, but records are mostly unreliable owing to confusion with the following species.
- E. scopoliana** Haw. Common among *Centaurea*. Ab. **parvulana** Wilk. (cf. Barrett, XI, pp. 201 f.): a few captured in a stone-pit at North Hinksey, July, 1913.
- E. expallidana** Haw. Boar's Hill, six specimens, 1897-1901 (A.S., N.V.S.). North and South Hinksey, on the borders of cultivated fields, frequent. North Oxford, one at light, 1898 (A.S.).
- E. caecimaculana** Hübn. Cothill, one captured on August 17th, 1927, among *Serratula tinctoria*.
- E. foenella** Linn. Tubney, one in 1904 (W.M.G.). Boar's Hill and Foxcombe Hill. Kennington, 1925. North Oxford. Summertown, one in 1907 (J.J.W.). Rather common in waste places and on the edges of fields, among *Artemisia vulgaris*.
- E. brunnichiana** Fröhl. Tubney. Boar's Hill, 1896 (N.V.S.). South Hinksey. Binsey, 1928. Yarnton. North Oxford. Often common among *Tussilago Farfara*.
- E. pflugiana** Haw. Common in wet meadows and moist woods. On *Cirsium palustre*.* Only the ordinary thistle-feeding form has been noticed.
- E. cnicicolana** Zell. South Hinksey, one captured in the old Rifle Range, May 15th, 1913. The identification of this specimen, due in the first instance to Mr. W. G. Sheldon, has been confirmed by an examination of the genitalia (*teste* O.W.R.).
- E. trigeminana** Steph. Tubney. Boar's Hill and Foxcombe Hill. Cumnor Hurst. Wytham Hill. Yarnton. Headington Wick. Hell Coppice. Locally plentiful among *Senecio Jacobaea*.
- E. obscurana** Steph. Bagley Wood, three captured on June 7th, 1897 (N.V.S., A.S.); one on June 8th, 1899 (W.G.P.-S.); one on June 2nd, 1901 (N.V.S.).
- E. tripunctana** Fabr. Common.
- E. subocellana** Don. Common among tallows.

- E. penkleriana** Fisch. v. Rösl. Common.
- E. ramella** Linn. Tubney Wood. Cothill. Boar's Hill. Bagley Wood. Shotover, 1902 (A.H.H.). Waterperry Wood. Rather common. On *Betula*.*
- E. bilunana** Haw. Boar's Hill. New Hinksey, on a fence, 1912. Port Meadow, 1903 (N.V.S.). The University Parks, 1894 (A.S.). Waterperry Wood. Among birch, local.
- E. nisella** Clerck. Common among willows. A form with predominantly grey colouring (= *cinerea* Haw.?—cf. Barrett, XI, p.106) abounds in Bagley Wood and Godstow Holt on the trunks of black poplars.
- E. demarniana** Fisch. v. Rösl. Boar's Hill: above Chilswell, one on May 16th, 1912. Hell Coppice, one on June 12th, 1928.
- E. tetraquetra** Haw. Common. On *Betula*,* etc.
- E. immundana** Fisch. v. Rösl. Cothill. Boar's Hill. Bagley Wood. Kennington, one in 1907 (W.H.). Wytham Woods, 1912. Local. On *Betula*,* but more frequent here among alder.
- E. tedella** Clerck. Very abundant among *Pinus Abies*, wherever the tree is planted.
- E. similana** Hübn. Tubney Wood. Cothill. Boar's Hill, many in 1891 (A.S.). Bagley Wood. On *Betula*.* Fairly common in its localities.
- E. ophthalmica** Hübn. Cothill. Bagley Wood. Shotover, many captured in 1898 (A.H.H.). Waterperry Wood, one in 1922. Locally rather common; among *Populus tremula*.
- E. solandriana** Linn. Common in woods. On *Betula*,* etc.
- E. semifuscana** Steph. Boar's Hill, one in 1891 (A.S.). Yarn-ton, among willows. Near Kirtlington, bred in 1927 (O.W.R.). Marston Ferry, in an osier bed. On *Salix viminalis*,* *S. fragilis** (O.W.R.), and probably other species.
- E. sordidana** Hübn. Cothill. Bagley Wood, common in 1897-99 (A.S., N.V.S.), and still frequent there. Among alder.
- Lathronympha hypericana** Hübn. Common wherever its food-plant grows freely. On *Hypericum perforatum*.*
- Bactra lanceolana** Hübn. Common in marshy places.
- B. furfurana** Haw. Binsey: sometimes common in a meadow by the Thames, among *Eleocharis palustris*. North Oxford, attracted to light, 1912 and 1920. Bullingdon Bog, one in 1925. Otmoor, 1928.

- Polychrosis euphorbiana** Freyer. Bagley Wood, a single example in fresh condition, June 2nd, 1921; flying above *Euphorbia Amygdaloides*.
- Lobesia permixtana** Hübn. Boar's Hill: Powderhill Copse, 1898 (N.V.S.). Bagley Wood. Waterperry Wood. Hell Coppice, 1921. Fairly common in its localities.
- Endothenia sellana** Hübn. [Cherbury Camp, 1920.] Tubney. Bagley Wood. North Hinksey. Yarnton railway embankment. In dry flowery places, not uncommon.
- E. gentianana** Hübn. Appleton Upper Common, 1922. Bagley Wood. Wytham Woods. Prattle Wood, 1928. Otmoor, 1928. Waterperry Wood, 1922. The moth is not often captured, but the larva is seldom missing where its food-plant grows. On *Dipsacus sylvestris*.*
- E. nigricostana** Haw. Cothill, 1912. Boar's Hill, 1896 (N.V.S.). Yarnton, 1912. Shotover, 1920 (A.H.H.). Near Hell Coppice, 1923. Single specimens only.
- E. carbonana** Doubl. Cothill. Boar's Hill: above Chilswell, one in 1920. Bagley Wood. South Hinksey: in the old Rifle Range. Wytham Woods, one in 1914. Frequent in woods and meadows on the Berkshire side of the Thames, among *Ajuga reptans*.
- E. ericetana** Westw. Hen Wood, one in 1901 (N.V.S.). North Oxford, one attracted to light, 1926. Hell Coppice, several captured since 1925.
- E. antiquana** Hübn. Hen Wood, one in 1894 (A.S.). Binsey, in ditches and by the Thames, 1921. North Oxford, occasionally taken on waste ground. Marston fields, one captured in 1899 by A. Sidgwick, now in the Pogson-Smith collection. Otmoor, one in a wet ditch, September 13th, 1928. Usually found in wet places where *Stachys palustris* grows, but sometimes strays.
- Argyroplote salicella** Linn. Foxcombe Hill. Bagley Wood. Marston fields, from 1890 (A.S.). Local, among willows. On *Salix fragilis** (O.W.R., Bagley, 1926).
- A. semifasciana** Haw. Bagley Wood, one in 1901 (W.G.P.-S.). Yarnton, frequent among willows. Marston Ferry, in an osier bed. Waterperry Wood, one in 1927. On *Salix viminalis*,* etc.
- A. corticana** Hübn. Cothill. Hen Wood, at light, 1901 (A.S.). Boar's Hill: above Chilswell, 1928. Bagley Wood. Among birch, not common.
- A. betulana** Haw. Tubney Wood. Cothill. Boar's Hill. Bagley Wood. Waterperry Wood. Shabington Wood. Rather common. On *Betula*.*

- A. capreana** Hübn. Cothill, 1925. Boar's Hill. Bagley Wood. Occurs sparingly.
- A. variegana** Hübn. Common. On *Crataegus*.*
- A. ochroleucana** Hübn. Boar's Hill. Yarnton. Marston, 1901-03 (A.S.). Otmoor, 1928. Waterperry Wood. Hell Coppice. Among rose, commoner than these records indicate.
- A. pruniana** Hübn. Common. On *Prunus spinosa*.*
- A. purpurana** Haw. Hen Wood: three captured at light, 1897 and 1899 (A.S., N.V.S.).
- A. striana** Schiff. Tubney Wood, 1912 (A.H.H.). Boar's Hill and Foxcombe Hill. Hen Wood, 1897 (A.S.). Kennington. North and South Hinksey. Oxford, sometimes comes to light. Marston fields, 1890 (A.S.). Headington, in a quarry, 1905 (N.V.S. diary).† On the south side of Stow Wood. Rather common.
- A. arcuella** Clerck. Tubney Wood. Boar's Hill: Powderhill Copse, 1896 (N.V.S.). Hen Wood, 1897 (A.S.), 1899 (A.H.H.), 1902 (N.V.S.). Bagley Wood. Waterperry Wood. Often abundant among oaks in woods.
- A. rivulana** Scop. Tubney, one in 1904 (W.M.G.). Boar's Hill, 1913. Yarnton, 1914. Bullingdon Bog, 1925. Hell Coppice. Local, not found commonly except in the last-mentioned locality.
- A. lacunana** Dup. Very common. Polyphagous.
- A. cespitana** Hübn. Wytham Woods: in a small area on the Coralline Oolite at the summit, 1914 and 1920.
- A. urticana** Hübn. Common in woods. On *Lonicera*,* *Betula*,* *Populus tremula*,* etc.
- A. branderiana** Linn. Bagley Wood. Waterperry Wood. Locally common. On *Populus tremula*.*
- A. profundana** Fabr. Tubney Wood. Bagley Wood. Wytham Woods. Marston Copse, one in 1890 (A.S.). Waterperry Wood. Hell Coppice. Shabbington Wood, 1928. Rather common among oaks.
- Hemimene petiverella** Linn. Common.
- H. alpinana** Treits. Boar's Hill. North and South Hinksey. Yarnton railway embankment. Headington Hill, 1917 (A.W.P.-C.). Bullingdon Bog. Shotover. Holton Pits. In waste places and on grassy slopes, common in many spots.

- H. quaestionana** Zell. Tubney, 1921. Foxcombe Hill. Yarnton railway embankment. North Oxford, in my garden. East Oxford, many in a garden, 1907 (A.H.H.). Locally common among *Tanacetum vulgare*, and in gardens on *Pyrethrum* and probably other *Asteraceae*.
- H. sequana** Hübn. Boar's Hill. South Hinksey. Yarnton railway embankment. Headington Hill, 1922 (A.W.P.-C.). Locally common among *Achillea Millefolium*.
- H. plumbagana** Treits. Common.
- H. simpliciana** Haw. Tubney. Foxcombe Hill and Boar's Hill. Locally common among *Artemisia vulgaris*.
- H. acuminatana** Zell. Kennington, 1920. Between Hen Wood and North Hinksey. Yarnton railway embankment. North Oxford, one on my lawn, 1916. Hell Coppice. Locally common, on grassy slopes.
- H. consortana** Wilk. Boar's Hill, 1913. Kennington, 1925. Binsey, 1913. Yarnton railway embankment, several in 1913. Found very sparingly, but probably overlooked.
- H. plumbana** Scop. Very common.
- H. saturnana** Guen. Foxcombe Hill. Yarnton railway embankment. Locally common. On *Tanacetum vulgare*.*
- Pammene nitidana** Fabr. Cothill. Bagley Wood. Waterperry Wood. Hell Coppice. Locally rather common. On *Quercus Robur*.*
- P. germarana** Hübn. Bagley Wood, two in 1900 (A.S.) ; still occurs there. Waterperry Wood. Hell Coppice. Usually scarce, but was found in plenty in a ride in Hell Coppice on June 5th, 1921.
- P. ochsenheimeriana** Zell. Bagley Wood, common in a plantation of *Pinus Abies*. First noticed in 1922.
- P. splendidulana** Guen. Tubney Wood. Boar's Hill. Bagley Wood. Wytham Woods. Waterperry Wood. Hell Coppice. Nowhere plentiful, but generally distributed in woods.
- P. fimbriana** Haw. Tubney Wood, bred from an oak-gall, 1921. Cothill. Bagley Wood, locally common.
- P. argyrana** Hübn. Common on oak trunks in all the woods.
- P. gallicolana** Zell. Cothill, one in 1912. Bagley Wood, one in 1902 (W.G.P.-S.) ; one in 1903 (N.V.S.) ; one in 1921.
- P. juliana** Curt. Boar's Hill, two captured on June 23rd, 1901 (A.S.). East Oxford, one bred from a larva found in an acorn, over twenty years ago (A.H.H.).†

- P. rhediella** Clerck. Tubney. Cothill. Boar's Hill. Yarnton. North Oxford. Bullingdon Bog, 1910 (A.H.H.). Shot-over. Hell Coppice. Common among hawthorn. In my garden seen emerging from pupae on a trunk of *Pyrus Aucuparia*.
- P. spiniana** Dup. Yarnton, plentiful in a hawthorn hedge by the Canal, 1913. Hell Coppice, on *Prunus spinosa*.* Oxford district, six specimens dated 1901 (W.G.P.-S.); four dated 1904 (W.M.G.).
- P. populana** Fabr. Boar's Hill, one on August 31st, 1900 (W.G.P.-S.). Waterperry Wood, one on September 3rd, 1925.
- P. regiana** Zell. Tubney Wood, larvae plentiful. Hen Wood, 1897 (A.S.). Bagley Wood, 1899 (A.S., N.V.S., W.G.P.-S.). North Oxford, on fences. East Oxford, 1903 (A.H.H.). On *Acer Pseudo-platanus*.*
- Laspeyresia roseticolana** Zell. Yarnton railway embankment. Holton Pits, 1924. Hell Coppice. Among rose.
- L. woeberiana** Schiff. Oxford, frequent among fruit trees in gardens. Headington Hill, on fences. Shotover, larvae mining the bark of *Prunus avium*,* 1922.
- L. ianthinana** Dup. South Hinksey. Binsey. Yarnton. Waterperry Wood. Hell Coppice. Shabbington Wood, 1928. Rather common among hawthorn.
- L. rufillana** Wilk. South Hinksey: in the old Rifle Range, among *Angelica sylvestris*. Bullingdon Bog, one in 1919 (A.H.H.). Hell Coppice, 1927.
- L. aurana** Fabr. Bagley Wood. South Hinksey. Between Binsey and Godstow. Yarnton. Shotover, from 1899 (A.H.H.). Rather common, among *Heracleum Sphondylium*.
- L. pomonella** Linn. Oxford, common in gardens and green-grocers' shops. On *Pyrus Malus*.*
- L. splendana** Hübn. Tubney Wood, one in 1913. Hen Wood, two in 1901 (N.V.S.). Oxford district, eight specimens dated 1900-01 (W.G.P.-S.).
- L. grossana** Haw. Bagley Wood, one captured on June 9th, 1899 (A.S.). Wytham Woods, one captured on June 10th, 1911.
- L. microgrammana** Guen. Kennington: four examples of this inconspicuous species were captured on June 28th and 30th, 1925, all in one spot.
- L. ulicetana** Haw. Abundant among *Ulex*.

- L. servillana** Dup. Tubney Wood. Cothill. Bagley Wood. Wytham Woods. Stanton St. John Wood. Waterperry Wood. Hell Coppice. Generally distributed in woods among willows, but not common. On *Salix cinerea*.*
- L. perlepidana** Haw. Cothill. South Hinksey. Wytham Woods, 1912. Yarnton railway embankment. Wolvercote: along the Canal. Waterperry Wood, 1927. Hell Coppice. Often plentiful.
- L. internana** Guen. Cothill, one in 1923. Boar's Hill: above Chilswell, plentiful. Headington Hill, one in 1921 (A.W.P.-C.). Very local, among *Ulex europaeus*.
- L. pallifrontana** Zell. Chilswell Hill, one on July 5th, 1903 (W.H.). Cumnor Hill, 1906 (J.C., A.H.H., A.S.); larvae in the same locality about ten years later (J.J.W.).† North Hinksey: many captured in an old stone-pit, 1906 (A.S., N.V.S.); abundant there in 1913. Very local, but occurs in great plenty. On *Astragalus glycyphyllos*.**
- L. compositella** Fabr. Cothill. Boar's Hill. Bagley Wood, 1897 (A.S.), 1920 (A.W.P.-C.). Kennington. North Hinksey. Wytham, 1901 (W.G.P.-S.). Yarnton. Headington Hill (A.W.P.-C.).† Shotover. Hell Coppice. Rather common, in waste places and clover fields.
- L. nigricana** Steph. Cothill. Boar's Hill. North and South Hinksey. Yarnton railway embankment. Bullingdon Bog. In fields and waste places, rather common.
- L. strobilella** Linn. Tubney Wood. Bagley Wood. On *Pinus Abies**; bred in plenty from the cones, 1914.
- L. coniferana** Ratz. Tubney, captured several times among firs.

TINEINA.

GELECHIADAE.

- Paltodora cytisella** Curt. Tubney Wood, 1927. Bagley Wood, sometimes fairly common in rides among bracken.
- Aristotelia bifractella** Dougl. Tubney Wood, one in 1920. Cothill. Hen Wood, two in 1901 (A.S., N.V.S.). Wytham Woods: on open ground near the summit. Forest Hill: plentiful in Polecat End Lane. On *Pulicaria dysenterica** and *Inula Conyza*.**
- A. inopella** Zell. Hen Wood: one captured on July 21st, 1901, in a field among fleabane (N.V.S.).

- A. atrella** Haw. Found in small numbers wherever *Hypericum perforatum* is plentiful.
- A. unicolorella** Dup. Tubney, one captured in 1913, others in 1924. Liable to be confused with the next species.
- A. tenebrella** Hübn. Tubney. Cothill. Boar's Hill. Bladon Heath. Yarnton. Chiefly on sandy soil, among *Rumex Acetosella*.
- A. arundinetella** Staint. Discovered in 1927 in a ditch at Binsey, where it is not scarce, though apparently confined to a single spot. Among *Carex acutiformis*.
- A. suffusella** Dougl. Binsey, a single example captured on August 5th, 1927, flying in a wet ditch.
- A. lutulentella** Zell. Cothill, a very dark example captured on June 10th, 1922. Between Binsey and Godstow, one flying along the tow-path, June 30th, 1914. North Oxford, a very pale example found in my study, probably attracted to light, July 20th, 1922.
- A. ericinella** Dup. Tubney Warren, 1922, among *Calluna vulgaris*.
- A. hermannella** Fabr. East Oxford, one captured in a garden, June 15th, 1902, and another in a house, August 23rd, 1908 (A.H.H.).
- A. stipella** Hübn. var. **naeviferella** Dup. Tubney, Cothill and Dry Sandford, in rough and fallow fields. North Oxford, common on waste ground. On *Chenopodium album** and *Atriplex patula*.*
- Stenolechia gemmella** Linn. Tubney Wood. Boar's Hill, 1894-1901 (A.S.). Bagley Wood. Wytham Woods. Hell Coppice. Rather common in oak woods.
- Parachronistis albiceps** Zell. Bagley Wood, one on an oak trunk, 1922. North Oxford, in my garden. Headington Hill, frequent on fences in rough weather.
- Recurvaria nanella** Hübn. North Oxford, in gardens. One captured in the University Museum, 1907 (W.H.). On *Pyrus communis**; many bred in 1902 (H.A.P.).
- R. leucatella** Clerck. Bagley Wood, two examples captured on July 1st, 1897, and July 28th, 1902, respectively (A.S.).
- Exoteleia dodecella** Linn. Tubney Warren, among *Pinus sylvestris*. Boar's Hill, one on a fence, 1920. Hen Wood, one in 1903 (N.V.S.).
- Epithectis mouffetella** Schiff. Cothill. Boar's Hill, one in 1900 (W.G.P.-S.). Bagley Wood, larvae frequent on

the honeysuckle growing round oak stools. North Oxford, occasional. Waterperry Wood, one in 1921. Hell Coppice, one in 1926. On *Lonicera Peri-Clymenum*.*

Telphusa scalella Scop. Bagley Wood. Waterperry Wood. Local, but abounds on oak trunks in favoured spots.

T. notatella Hübn. Cothill. Boar's Hill, one in 1901 (W.G.P.-S.). Yarnton. On *Salix cinerea** and a species of osier.*

T. proximella Hübn. Cothill. Boar's Hill. Bagley Wood, 1898 (A.S., N.V.S.), 1902 (W.M.G.). Local, among birch and alder.

T. fugitivella Zell. Cothill, 1923. Headington Hill, common on fences during rough weather. Between Summer-town and Water Eaton, among elms, 1924.

T. vulgella Hübn. Cothill. Boar's Hill. South Hinksey. Oxford, on fences. Bullingdon Bog. Forest Hill: larva found in Polecat End Lane, 1924. Widely distributed, but usually taken singly. On *Crataegus*.*

T. triparella Zell. Bagley Wood. Waterperry Wood. Among stubby oaks, not common.

T. luculella Hübn. Tubney Wood. Cothill. Bagley Wood. Wytham Woods. Waterperry Wood. Hell Coppice. On *Quercus Robur*.* Often abounds on oak trunks.

T. sequax Haw. [Cherbury Camp.] Wytham Hill. South Hinksey. Holton Pits. Confined to calcareous soil, but usually common where it occurs.

Celechia basaltinella Zell. Tubney, in thatch and flying round old walls; very local but not scarce. Dry Sandford, one in 1922.

G. domestica Haw. Tubney, 1911. Hen Wood, 1903 (N.V.S.). Oxford, common in and around houses.

G. umbrosella Zell. Oxford: one in my study, apparently attracted to light, October 5th, 1921; one on a window in the University Museum, July, 1924 (A.H.H.). Perhaps accidentally introduced, the normal habitat of this species being coast sandhills and sandy heaths.

G. affinis Haw. Tubney. Cothill. Wytham. The canal bank near Wolvercote, 1907 (W.H.). Oxford, common about walls of gardens and houses.

G. senectella Zell. Tubney. Boar's Hill. North and South Hinksey. Wytham Hill. Yarnton. Rather common among *Senecio Jacobaea*.

- G. desertella** Dougl. Tubney: common on and around the Warren; sometimes very abundant in thatch. Boar's Hill, locally common. Chiefly a coast species; here confined to sandy soil.
- G. politella** Staint. Boar's Hill: one captured on the hills above Chilswell, June 5th, 1915.
- G. terrella** Hübn. Common. Light brown forms, captured at Cothill, Cumnor, Wytham Woods, Yarnton and Hell Coppice, are connected by intermediates with the typical form.
- G. diffinis** Haw. Tubney. Boar's Hill and Hen Wood. Cumnor Hurst. Oxford, one in 1905 (W.H.). Locally plentiful in sandy places. Among *Rumex Acetosella*.
- G. mulinella** Zell. Tubney. Boar's Hill. Cumnor Hurst. Among *Ulex europaeus*.
- G. ericetella** Hübn. Tubney Warren. Boar's Hill: in the Youlbury grounds. Bagley Wood, one in 1899 (N.V.S.). Bladon Heath. Among *Calluna vulgaris*.
- G. velocella** Dup. Boar's Hill: common in July, 1915, on a sandy hillside above Chilswell, among *Rumex Acetosella*; not seen there since. Shotover, one example captured, date uncertain (A.H.H.).
- G. rhombella** Schiff. North Oxford: in gardens, among apple trees. Headington Hill: in a garden, frequent (A.W.P.-C.).†
- G. distinctella** Zell. Tubney, two captured in 1920. Boar's Hill: common in 1915 in company with *G. velocella*; not seen there since.
- G. sororculella** Hübn. Cothill. Boar's Hill. Bagley Wood. Yarnton. Frequent among willows. Wolvercote, larvae on *Salix viminalis*.*
- G. nigra** Haw. Cothill, on trunks of *Populus canescens*, July, 1925.
- G. lentiginosella** Zell. Hell Coppice, sometimes plentiful. On *Genista tinctoria*.*
- Phthorimaea atriplicella** Fisch. v. Rösl. Oxford, one bred in 1924 from a larva found the previous autumn. On *Chenopodium album*.*
- P. costella** Westw. Cothill. South Hinksey, one in 1913. Binsey, one in 1923. Oxford: larvae common by the Canal. Headington: plentiful in a hedge near the old village, 1920. Otmoor, one bred in 1928. On *Solanum Dulcamara*.*

- P. artemisiella** Treits. On the south side of Stow Wood. Holton Pits, plentiful among *Thymus*.
- P. acuminatella** Sirc. Cothill. Kennington. South Hinksey. Wytham Woods. Yarnton. On the north-west side of Holton Wood. Polecat End Lane. Hell Coppice. Inhabits rough meadows and the edges of cultivated fields. The moth is found sparingly, but larvae are common. On *Cirsium arvense** and *C. lanceolatum*.*
- P. maculea** Haw. Bagley Wood, one in 1913. Oxford district, one bred in 1923; precise locality uncertain. On *Stellaria Holostea*.*
- P. fraternella** Dougl. Cothill, one captured on August 5th, 1913.
- P. tricolorella** Haw. Shotover, larvae common in 1922. On *Stellaria Holostea*.*
- P. marmorea** Haw. Tubney: sometimes common on the Warren, around the old sand-pit, and in thatch; first noticed there in 1919. Foxcombe Hill: one captured on a sandy bank, July 20th, 1913. Sandy places by the sea are the normal habitat of this species; its occurrence so far inland is very remarkable.
- Sophronia semicostella** Hübn. Tubney. Boar's Hill: in the Youlbury grounds and above Chilswell. On the south side of Stow Wood. Hell Coppice. Commonest on sandy soil.
- Stomopteryx anthyllidella** Hübn. South Hinksey. Wytham Hill, 1915. Bullingdon Bog. Near Forest Hill: in a meadow by Holton Brook, 1922. On *Anthyllis Vulneraria***.
- S. vorticella** Scop. Boar's Hill. Cumnor Hurst, one in 1928. Bagley Wood, larvae locally common. Kennington. Near Marston Ferry, one in 1900 (W.H.). Waterperry Wood, 1922. Hell Coppice. On *Lotus uliginosus*.*
- S. taeniolella** Zell. [Cherbury Camp, 1920.] Hen Wood, 1901 (A.S., N.V.S.). Holton Pits, 1925. Other records uncertain, owing to confusion with the preceding species.
- Acanthophila alacella** Dup. Bagley Wood, two found on oak trunks, July, 1920. Waterperry Wood, on oak trunks, 1921, 1922 and 1925. Hell Coppice, one captured on the wing, 1925.
- Anacampsis populella** Clerck. Cothill. Boar's Hill. Bagley Wood. Waterperry Wood. Rather common. On *Populus tremula** and *Salix cinerea*.*

- Acompsia cinerella** Clerck. Tubney. Cothill. Hen Wood, many in 1901 (A.S., N.V.S.). Bagley Wood. South Hinksey. Rather common on the Berkshire side of the Thames.
- Anarsia spartiella** Schranck. Boar's Hill: in the Youlbury grounds and above Chilswell. Cumnor Hurst. Among *Ulex europaeus*.*
- A. genistae** Staint. Hell Coppice, one captured among *Genista tinctoria*, July 1st, 1925. Possibly conspecific with *A. spartiella* (cf. Meyrick's Handbook, p. 644), but larger and darker.
- Chelaria conscriptella** Hübn. Tubney Wood. Boar's Hill. Bagley Wood. [Glympton.] Waterperry Wood. Rather common in woods.
- C. gibbosella** Zell. Tubney Wood. Cothill, one in 1927. Bagley Wood. Wytham Woods. Stanton St. John Wood, one in 1920. Waterperry Wood. Hell Coppice, one in 1928. Frequent on oak trunks in woods.
- Dichomeris marginella** Fabr. North Oxford, one captured at light, July 30th, 1899 (N.V.S.); no doubt artificially introduced, as its food-plant (juniper) no longer grows naturally in or near Oxford.
- Brachmia gerronella** Zell. Cothill, 1922. Boar's Hill: Tommy's Heath, 1922 (O.W.R.). Cumnor Hurst, 1928. Bagley Wood, 1926. Headington Hill, on a fence, 1925. A single example in each instance.
- B. rufescens** Haw. Tubney. Cothill. North Hinksey. Yarn-ton. Oxford. Headington Hill. Otmoor. Rather common. On *Brachypodium sylvaticum** and other grasses.

COSMOPTERYCIDAE.

- Cosmopteryx druryella** Zell. Waterperry Wood, in grassy rides, 1921 and 1925. Very local, but rather common in the favoured spots. Flies freely in evening sunshine.
- Limnoecia epilobiella** Roem. Cothill, larvae seen on *Circaea lutetiana*,**1925. Bladon Heath, one on April 30th, 1921 (O.W.R.).† Stanton St. John Wood, occurs regularly in thatch; first noticed in 1924.
- Chrysoclista rhamniella** Zell. Cothill, larvae found commonly in 1923, all on one tree. On *Rhamnus catharticus*.*
- C. atra** Haw. Boar's Hill. North Hinksey, one in 1920. Yarn-ton, one in 1913. Headington Hill, sometimes common on fences.

- C. vinolentella** Herr.-Schäff. North Oxford: three examples captured among fruit trees in my garden, 1915 and 1920.
- C. aurifrontella** Hübn. Occurs throughout the district, and even in the centre of Oxford; chiefly in hedges, and among hawthorns in woods.
- Mompha terminella** Westw. Bagley Wood. The moth is seldom observed, but the larvae are common. First noticed in 1924. On *Circaea lutetiana*.*
- M. raschkiella** Zell. Cothill, bred from larvae, 1928. Bagley Wood, common. Wytham Woods, one mine seen in 1928. On *Epilobium angustifolium*.*
- M. conturbatella** Hübn. Cothill, one in 1928. Bagley Wood, common. On *Epilobium angustifolium*.* This beautiful species, like the preceding, is steadily extending its range.
- M. propinquella** Staint. Cothill, larvae rather common in one spot, 1924. Bagley Wood. North Hinksey, one seen in 1920. Hell Coppice, one in 1925. On *Epilobium hirsutum*.*
- M. lacteella** Steph. Cothill. Bagley Wood. Wytham Woods. Yarnton. Waterperry Wood. Hell Coppice. Not uncommon in woods.
- M. decorella** Steph. Tubney. Chawley, 1920. Bagley Wood. Stanton St. John Wood. Sometimes common in thatch, especially in the last-mentioned locality.
- M. subbistrigella** Haw. Tubney. Bagley Wood, plentiful. Little Wittenham. Stanton St. John Wood. Shabbington Wood. On *Epilobium montanum*.* Often common in thatch.
- M. fulvescens** Haw. Common. On *Epilobium hirsutum*.*
- M. ochraeella** Curt. Cothill, one bred in 1924; one captured in 1928 (A.H.H.). Binsey: along the Upper River, sometimes in numbers. Yarnton, one in 1912. East Oxford, one in 1911 (A.H.H.). On *Epilobium hirsutum*.*
- M. miscella** Schiff. Tubney, larvae seen. Wytham Woods, larvae seen. Holton Pits, plentiful. On *Helianthemum Chamaecistus*.**
- Batrachedra praeangusta** Haw. Tubney. Cothill. Boar's Hill. Near Medley Weir. Yarnton. Oxford: in the University Parks. Among willows and poplars; often common on the trunks.
- B. pinicolella** Dup. Hen Wood, at light, 1901 (N.V.S.). Bagley Wood, common in fir plantations. On *Pinus Abies*.*

OECOPHORIDAE.

- Oecophora geoffrella** Linn. Cothill. Between Bessels Leigh and Hen Wood, 1914. Boar's Hill and Hen Wood. Local, sometimes found commonly.
- Dasycera sulphurella** Fabr. Very common. Larvae in dead wood (posts, fallen branches, etc.)* and under the bark of live stumps.*
- Schiffermuelleria augustella** Hübn. Oxford district, one captured in late May, 1893 (A.S., cf. 1901 list); there is no indication of the locality in the captor's diary.
- S. tripuncta** Haw. Hell Coppice, one captured on June 5th, 1921; disturbed from bushes.
- Chirocampa lunaris** Haw. Cothill, 1922. Boar's Hill. Kennington, 1925. Binsey, 1928. East Oxford, 1902 (A.H.H.). Headington Hill, on fences. Rather common.
- C. lambdella** Don. Headington Hill: in a garden, on bushes of *Ulex* imported from Surrey, about 1919-22 (A.W.P.-C.).† Evidently an introduced species only.
- Endrosis lactella** Schiff. Common in houses. Headington Hill, bred from birds' nests found by A. H. Hamm, 1926.
- Borkhausenia fuscescens** Haw. Common. Sometimes abounds in thatch at Tubney. Bred from birds' nests found by A. H. Hamm at Headington, 1925 and 1928.
- B. minutella** Linn. Tubney; in thatch. Boar's Hill: above Chilswell, one in 1897 (N.V.S.). Binsey, one in 1928.
- B. tinctella** Hübn. Tubney Wood. Cothill. Boar's Hill: Powderhill Copse, 1896 (N.V.S.). Bagley Wood. Kennington, 1925. Wytham Woods. Waterperry Wood. Rather common in woods.
- B. unitella** Hübn. Tubney Wood. Bagley Wood. Godstow Holt, 1914. Oxford, on fences and in gardens. Waterperry Wood. Hell Coppice. Rather common.
- B. flavifrontella** Hübn. Bagley Wood, single specimens captured in 1921 and 1925.
- B. pseudopretella** Staint. Very common in houses and a troublesome pest. Bred from birds' nests found by A. H. Hamm at Oxford and Headington, 1926.
- Chimabache fagella** Fabr. Plentiful in all woods. The melanic form (ab. **dormoyella** Dup.) is common. On *Quercus Robur*,* *Salix cinerea*,* etc.

- C. phryganella** Hübn. Common, chiefly in oak woods.
- Carcina quercana** Fabr. Common in woods. North Oxford, in gardens. On *Quercus Robur** and *Pyrus Malus*.*
- Depressaria discipunctella** Herr.-Schäff. Tubney, one obtained from thatch, September 16th, 1924.
- D. chaerophylli** Zell. Tubney, several obtained from thatch since 1920.
- D. weirella** Staint. South Hinksey: one in the Happy Valley, 1913. Near Yarnton: one disturbed from a hedge by the Canal, 1913. Wolvercote, one bred, 1926. On *Anthriscus sylvestris*.*
- D. heracliata** De Geer. Common. On *Peucedanum sativum*.*
- D. pulcherrimella** Staint. Bladon Heath, one captured on May 9th, 1912 (the date suggests hibernation).
- D. badiella** Hübn. Tubney, one in thatch, 1919. Headington Wick: on open ground above the copse, 1919.
- D. pimpinellae** Zell. Tubney, one obtained from thatch on September 18th, 1924, another on August 30th, 1925.
- D. ultimella** Staint. Tubney, one in 1920. Wytham, 1920. Headington Wick, 1920. Stanton St. John Wood. Local, found only in thatch.
- D. costosa** Haw. Common among *Ulex*.
- D. umbellana** Steph. Tubney Wood. Boar's Hill, 1900-03 (N.V.S.). Shotover, 1895 (A.S. diary).† Local, among *Ulex*.
- D. liturella** Schiff. Hen Wood, 1899 (N.V.S.). Marston, 1899 (N.V.S.). Oxford district, four specimens, 1893-99 (A.S.); one specimen, 1900 (W.G.P.-S.); two bred in 1923, precise locality uncertain. On *Centaurea*.*
- D. assimilella** Treits. Cumnor Hurst, larvae plentiful. On *Cytisus scoparius*.*
- D. atomella** Schiff. Hell Coppice, a few examples captured or bred, 1920-22. On *Genista tinctoria*.*
- D. subpropinquella** Staint. Common, especially in ricks and thatch. Ab. **rhodochrella** Herr.-Schäff. is frequent.
- D. arenella** Schiff. Common. On *Centaurea Scabiosa*,* etc.
- D. propinquella** Treits. Tubney. Boar's Hill. Between Wytham Woods and Botley. Holton, 1927. Stanton St. John Wood. Between Shabbington and Oakley Woods, 1920. In thatch and ricks, rather local, but sometimes plentiful. An example of the form without a dark discal spot was captured in Stanton St. John Wood on October 16th, 1924.

- D. angelicella** Hübn. Cothill. South Hinksey: in the old Rifle Range. Godstow Holt. Locally common. On *Angelica sylvestris*.*
- D. ciliella** Staint. Tubney, common in thatch. Cothill, larvae found in 1927. Stanton St. John Wood, one in 1924. On *Angelica sylvestris*.* The bred specimens are a striking unicolorous dark brown form.
- D. applana** Fabr. Very common. On *Anthriscus sylvestris*.* A dark, nearly unicolorous form occurs.
- D. purpurea** Haw. Common in thatch and frequent in hedges.
- D. alstroemeriana** Clerck. Tubney. Boar's Hill, 1893 (A.S.), 1897 (N.V.S.). Wytham Woods, 1919. Godstow, 1899 (N.V.S. diary).† Wood Eaton, 1902 (N.V.S. diary).† Headington Wick, 1920. Beckley, 1913. Stanton St. John Wood. Hell Coppice, 1928. Not common; mostly single specimens, disturbed from thatch or ricks, or found on ivy bloom.
- D. ocellana** Fabr. Tubney. Cothill. Bessels Leigh, 1920. Bagley Wood, 1921. Scarce except at Tubney, where it is common in thatch.
- D. yeatiana** Fabr. Hen Wood, one in 1903 (N.V.S.). Beckley, one in a rick, 1913. Stanton St. John Wood, one in thatch, 1924. Oxford district, one in 1907 (W.G.P.-S.). Scarce in this district.
- D. hypericella** Hübn. Foxcombe Hill, 1919. Wytham Woods. Yarnton, 1915. Hell Coppice. The imago is seldom observed, but the larvae are locally common. On *Hypericum perforatum*.*
- D. conterminella** Zell. Wolvercote, larvae plentiful in 1926. Oxford, 1890 (A.S.). Marston Ferry, larvae in 1925. On *Salix viminalis** and *S. triandra*.*
- Epigrapta steinkellneriana** Schiff. Oxford district, one specimen dated May, 1893 (A.S.); not mentioned in the captor's diary.

ORNEODIDAE.

- Orneodes hexadactyla** Linn. North Oxford, one at light, July 28th, 1908 (A.S. diary).† East Oxford: one in an out-house, about fifteen years ago (A.H.H.). Oxford district, one in July, 1895 (A.S.). Surprisingly rare; I have never seen it in the district.

AEGERIADAE.

- Aegeria ichneumoniformis** Fabr. Headington: in a stone-pit above Bullingdon Bog, August 4th, 1919 (A.H.H.), † July, 1904 (J.J.W.).
- A. formiciformis** Esp. Godstow, one captured in 1924 (O.W.R.). † Yarnton, one swept from herbage, about 1912 (J.J.W.); bred, 1922. Marston Ferry, in an osier bed (A.H.H.). † On *Salix viminalis*.*
- A. culiciformis** Linn. Tubney Wood, larvae, 1922. Headington: near Bayswater Mill, one captured on May 30th, 1914 (an unexpected locality, where there is alder, but no birch). † Waterperry Wood, larvae, 1922. Larva in stumps of *Betula alba*.*
- A. myopiformis** Borkh. North Oxford: in my garden, 1921-22. East Oxford, in gardens, 1900, 1920 (A.H.H.). † On *Pyrus Malus*.**
- A. vespiformis** Linn. Tubney Wood (Berkshire list). † In a lane between Tubney and Cothill, one captured about 1915 (J.J.W.). Hen Wood, one captured in 1901 (A.H.H.). † Boar's Hill: Red Copse, larvae plentiful in 1915. Bagley Wood, 1899 (A.H.H.) †; sometimes common there in the larval stage. Larva in stumps of *Quercus Robur*.*
- A. tipuliformis** Clerck. North Oxford, common in gardens. East Oxford, in gardens (A.H.H.).
- A. flaviventris** Staud. Wytham Woods. Yarnton. Headington Quarry (W.F.). † Hell Coppice. Shabbington Wood. Larva in stems and twigs of *Salix cinerea*.* Widely distributed in the district, and common in some spots, but not discovered till 1928; cf. Ent.Mo.Mag., LXIV, 1928, p.186.
- A. andreniformis** Lasp. Tubney Wood. Bagley Wood. Sandford-on-Thames: a specimen captured in a house during the period 1914-18 was brought to the University Museum for identification (*teste* A.H.H.). † Wytham Woods. Larva in stems of *Viburnum Lantana*** and *V. Opulus*** ; the burrows are common. Mr. Hamm has in his possession an empty burrow of this species found in Bagley Wood as far back as July, 1898, when its identity was still unknown. †
- Trochilium apiforme** Clerck. Cothill, 1912 (R. J. Champion). Bagley Wood (W.H., A.S., A.H.H.). Godstow Holt and neighbouring meadows. North Oxford. East Oxford (A.H.H.). † Cherwell fields, near Oxford, 1896 (A.S. diary). † The burrows of the larvae may be found plenti-

fully in woods, meadows, gardens, etc., in and around Oxford, wherever poplars grow or are planted. On black poplar* and *Populus canescens*** ; but never on *P. italica* (teste A.H.H.).

- T. crabroniforme** Lew. Bagley Wood, one bred in 1899 (A.H.H.).† Open Brasenose, burrows seen (A.H.H.).† On sallow.*

HELIOZELIDAE.

Heliozela sericiella Haw. Common in woods and copses. On *Quercus Robur*.**

H. resplendella Staint. Cothill, captured and bred ; the mines are not scarce. On *Alnus glutinosa*.*

H. betulae Staint. Cothill, mines found, 1926-28. Boar's Hill : above Chilswell, a mine found in 1926. Waterperry Wood, one mine, 1927. Hell Coppice, one captured on July 2nd, 1922. Erroneously recorded in 1926 (Nat.Hist.Ox., p.233) from the University Parks. On *Betula alba*** and *B. pubescens*.**

Antispila pfeifferella Hübn. Bagley Wood, South Hinksey : one in the old Rifle Range, 1912. Wytham Woods, mines found, 1928. Between Kirtlington and Weston-on-the-Green, mines found, 1928. Waterperry Wood. Hell Coppice. Widely distributed, but occurs sparingly. On *Cornus sanguinea*.**

HELIODINIDAE.

Stathmopoda pedella Linn. Bagley Wood, three captured in June, 1922. Cothill, one in June, 1922. Shotover, one on June 29th, 1918 (A.H.H.). Among alders.

Pancalia leuwenhoekella Linn. Tubney Wood. Cothill, 1912. Bagley Wood. Wytham Woods. Marston fields, 1891 (A.S. diary).† Headington Wick Copse, 1912. Holton Pits. Hell Coppice. Locally common, sometimes abundant.

Schreckensteinia festaliella Hübn. Cothill, one in 1924. Boar's Hill : above Chilswell. Bagley Wood, fairly common.

GLYPHIPTERYGIDAE.

Simaethis fabriciana Linn. Very common, among nettles.

Choreutis myllerana Fabr. Bagley Wood, one in 1923. God-

stow Holt, 1915. Near the Weirs, between New Hinksey and Iffley, 1898 (A.H.H.). Between Yarnton and Wolvercote: common on the Canal bank. By the Cherwell near Marston Ferry, 1899-1900 (A.S., W.H.). Holton Brook near Forest Hill, one in 1919. Locally common, among *Scutellaria galericulata*.

Glyphipteryx fuscoviridella Haw. Common.

G. thrasonella Scop. Common in marshy places among *Juncus*.

G. fischeriella Zell. Very common. On *Dactylis glomerata*.**

G. schoenicolella Staint. Cothill, plentiful in marshy spots among its food-plant. On *Schoenus nigricans*.* Cf. Ent.Mo.Mag., LXIV, 1928, p.252.

G. equitella Scop. North Oxford, on walls in my garden, 1915-16. Headington Hill, plentiful in a garden among stonecrop (A.W.P.-C.).†

ELACHISTIDAE.

Perittia obscuripunctella Staint. Boar's Hill: above Chils-well. Bagley Wood. Shotover. Not common. On *Lonicera Peri-Clymenum*.**

Stephensia brunnichiella Linn. Bagley Wood. North Hinksey, in an old stone-pit. Locally common. On *Clinopodium vulgare*.*

Elachista cinereopunctella Haw. Waterperry Wood, 1921 and 1923. Hell Coppice, 1921. A single example in each instance.

E. magnificella Tengst. Boar's Hill: Red Copse, rather common on a large patch of its food-plant. On *Juncoides sylvaticum*.*

E. gleichenella Fabr. Boar's Hill: Red Copse, one bred, 1924. Waterperry Wood, 1922. Hell Coppice, sometimes plentiful. On *Juncoides sylvaticum*,* but this is not its normal food-plant.

E. albifrontella Hübn. Common, often abundant. On *Deschampsia caespitosa*,* *Brachypodium sylvaticum*,* and several undetermined grasses.

E. luticomella Zell. Tubney Wood. Hitch Copse. Cothill. Kennington: on the edge of Bagley Wood. North Hinksey, 1906 (N.V.S.). Water Eaton: in a grass-bordered lane. Hell Coppice. Common in many places. On *Dactylis glomerata*.*

- E. atricomella** Staint. Cothill. Bagley Wood. Cumnor Hill, 1906 (N.V.S.). Wytham Woods. Yarnton railway embankment. Headington Hill, on fences. Hell Coppice. Widely distributed, but only captured one or two at a time.
- E. alpinella** Staint. Cothill. Bagley Wood, one in 1925. South Hinksey: in the old Rifle Range. Wytham Woods, larvae seen, 1928. Weston-on-the-Green, 1928. Locally plentiful. On *Carex acutiformis*.*
- E. poae** Staint. Binsey: one pupa found in a ditch by the tow-path, 1925. Marston Ferry: larvae and pupae found commonly on the banks of the Chervell and in the adjoining ditches, 1925. On *Glyceria aquatica*.*
- E. perplexella** Staint. Cothill. Bagley Wood, locally plentiful. Pixey Mead, one in 1923 (O.W.R.). [Finstock, 1925.] Yarnton, one in 1922. Waterperry Wood. Hell Coppice. On *Deschampsia caespitosa*.*
- E. subnigrella** Frey. Wolvercote: plentiful on a disused railway line. Holton Pits. On *Bromus erectus*.*
- E. stabilella** Frey. Boar's Hill, one in 1922. Kennington, 1925. Hell Coppice, plentiful in August, 1923.
- E. nigrella** Haw. Common.
- E. bedellella** Sirc. Holton Pits, one on June 4th, 1925.
- E. obscurella** Staint. Common.
- E. taeniatella** Staint. Cothill. Bagley Wood. Wytham Woods, one in 1915. Yarnton railway embankment. Local. On *Brachypodium sylvaticum*.*
- E. zonariella** Tengst. Bagley Wood, 1919. Yarnton railway embankment, 1915. Headington Hill, on a fence, 1925. Marston, 1902 (W.M.G.). Hell Coppice, 1925. Oxford district, 1901 (W.G.P.-S.). Captured singly in each instance.
- E. megerlella** Staint. Cothill, one in 1922. Boar's Hill: above Chilswell, June, 1897 (A.S., N.V.S.). Headington Hill, one on a fence, 1925. Headington Wick, one in 1896 (A.S.). Oxford district, one in 1900 (W.G.P.-S.).
- E. paludum** Frey. Cothill, larvae not scarce, but very local. On *Carex paniculata*.*
- E. biatomella** Staint. Near Forest Hill: in a meadow by Holton Brook, 1922. Hell Coppice, frequent. Certainly occurs on the Berkshire side of the river also.
- E. rhynchosporella** Staint. Bullingdon Bog, four specimens captured on July 2nd, 1900, among *Eriophorum* (A.H.H.).

- E. cerussella** Hübn. Kennington, 1925. Binsey. Godstow Holt, larvae. Yarnton. Oxford: by the Canal, and in the University Parks. Otmoor, larvae found in 1928. Locally common. On *Phragmites Phragmites*.**
- E. subocellea** Steph. Cothill, 1927. Wytham Hill. Yarnton railway embankment. Holton Pits, 1924. Not common. The less distinctly marked examples, formerly treated as a separate species under the name *E. disertella* Herr.-Schäff., are now regarded by Mr. Meyrick (Handbook, p. 720) as conspecific with *E. subocellea*. Both forms occur in this district.
- E. triatomea** Haw. Cothill. Cumnor Hurst, 1924. Yarnton railway embankment. Bullingdon Bog. On the south side of Stow Wood, 1924. Holton Pits, 1924. Hell Coppice. In grassy places, widely distributed; commonest in wet meadows.
- E. rufocinerea** Haw. Common.
- E. cygnipennella** Hübn. Common. On *Dactylis glomerata** and undetermined grasses.
- E. subalbidella** Schläg. Cothill, on marshy ground, one captured in 1916, several in 1927.

SCYTHRIDAE.

- Scythris fletcherella** Durr. Wytham Woods, one in 1914. Holton Pits. Fairly common.
- S. senescens** Staint. Wytham Woods, two in 1914. Holton Pits, one in 1924. This and the preceding species are confined to spots with calcareous soil and a down-like flora.
- S. chenopodiella** Hübn. East Oxford, taken commonly in 1898 and 1899 (A.H.H.).

HYPONOMEUTIDAE.

- Ocnerostoma piniariella** Zell. Tubney Warren, common. Bagley Wood, 1902 (W.G.P.-S.). Bladon Heath, seen in 1915. On *Pinus sylvestris*.*
- Cedestis farinatella** Dup. Tubney Warren. Bagley Wood. Locally plentiful. On *Pinus sylvestris** and *P. nigra*.*
- C. gysselelli** Dup. Tubney Warren, fairly common. Boar's Hill: one in the Youldbury grounds, 1928. Bagley Wood, one in 1925. Among *Pinus sylvestris*.

- Argyresthia atmoriella** Banks. Tubney Warren. Cothill. Bagley Wood. Locally plentiful. On *Larix*.* Reported in 1907, under the name *A. laevigatella* Herr-Schäff., as a pest on larch (including Japanese larch) in Bagley Wood [and at Sarsden, Oxfordshire]; examples bred at that time by G. H. Grosvenor are in the Hope Department. Cf. W. Somerville, in Quarterly Journal for Forestry, I, 1907, p. 204; R. S. MacDougall, in Transactions of the Scottish Arboricultural Society, XXI, p. 195; and other writers in Quarterly Journal for Forestry, V, 1911, pp. 274ff. A much earlier specimen, captured in Bagley Wood on June 14th, 1902, is in the collection of N. V. Sidgwick.
- A. glabratella** Zell. Tubney Wood, since 1925. Bagley Wood, since 1921. Wytham Woods, since 1913. Locally common. On *Pinus Abies*.*
- A. dilectella** Zell. North Oxford, occasionally comes to light. Headington Hill, sometimes abundant on fences beneath or near conifers.
- A. andereggiella** Dup. Bagley Wood, many specimens dated 1897-1902 in the Sidgwick, Pogson-Smith and Geldart collections; it still occurs there, among old crab-apple trees.
- A. brockeella** Hübn. Common. On *Betula*.* A unicolorous golden form occurs.
- A. goedartella** Linn. Common, often abundant. On *Betula**; larvae in the catkins (Cothill, Wytham Woods), and found in plenty in a rotten birch stump (Boar's Hill, 1919). Common also among alder at Cothill. Varies greatly in its markings, the extreme forms being unicolorous white and unicolorous golden respectively.
- A. pygmaeella** Hübn. Cothill. Bagley Wood. South Hinksey: in the old Rifle Range. Yarnton. Rather common among sallows. On *Salix cinerea** and *S. viminalis** (Yarnton, 1922).
- A. cornella** Fabr. Tubney. Boar's Hill, 1890 (A.S.). Kennington. North and South Hinksey. Oxford, in gardens. Headington Hill, on fences. Rather common. On *Pyrus Malus** (H.A.P., 1902).
- A. retinella** Zell. Common among birch.
- A. glaucinella** Zell. Water Eaton, one on an oak trunk, July 2nd, 1924.
- A. mendica** Haw. Common among *Prunus spinosa*.

- A. semifusca** Haw. Tubney Wood, 1919. Bagley Wood, 1919. North Hinksey, 1913. Yarnton, 1924. Headington Hill, on fences, 1920. Marston, 1898 (A.S.). Stanton St. John, 1924. Widely distributed, but always taken singly.
- A. conjugella** Zell. Headington Hill: occurs regularly in a garden among *Pyrus Aucuparia* (A.W.P.-C.).†
- A. ephippella** Fabr. Boar's Hill. Godstow, 1913. Oxford, in my garden. Headington Hill, 1917 (A.W.P.-C.).
- A. nitidella** Fabr. Common among hawthorn. Ab. **ossea** Haw. is frequent.
- A. albistria** Haw. Common. On *Prunus spinosa*.*
- A. semitestacella** Curt. Bagley Wood, many captured in 1900 and 1903 (A.S., N.V.S., W.M.G.). Wytham Woods. Waterperry Wood, 1920. Among beech.
- Zelleria hepariella** Staint. Bagley Wood, two examples only, disturbed from ash saplings, 1921 and 1923. Oxford, one captured at light, July 30th, 1899 (N.V.S.).
- Swammerdamia combinella** Hübn. Boar's Hill, 1895 and 1897 (A.S., N.V.S.). Yarnton, one in 1912. Oxford district, one in 1906 (W.M.G.). Rather scarce in this district.
- S. heroldella** Hübn. Cothill. Boar's Hill. Waterperry Wood. Hell Coppice. Rather common. On *Betula*.*
- S. lutarea** Haw. Common. On *Crataegus*.*
- S. caesiella** Hübn. Kennington. Yarnton. Hell Coppice. Locally plentiful. On *Prunus spinosa*.*
- S. pyrella** Vill. Common, especially in gardens. On *Pyrus Malus** and *P. communis*.*
- Prays curtisellus** Don. Common. On *Fraxinus excelsior*.* The unicolorous black form (ab. **rustica** Haw.) is almost as frequent as the type.
- Hyponomeuta plumbella** Schiff. Tubney Wood. Cothill. Hen Wood, 1897 and 1899 (A.S., N.V.S.). Bagley Wood. Marston, 1900 (A.S. diary).† Local, among *Euonymus europaeus*.
- H. padella** Linn. Abundant. On *Prunus spinosa** and *Crataegus*.*
- H. malinella** Zell. North Oxford, in my garden. Near Shabington Wood, bred from larvae in 1924. On *Pyrus Malus*.*

- H. cognatella** Hübn. Abundant among its native food-plant, chiefly on the Berkshire side of the Thames. In Oxford it is a pest in gardens and shrubberies. On *Euonymus europaeus** and *E. japonicus*.*
- Scythropia crataegella** Linn. Bagley Wood. Waterperry Wood. Shabbington Wood. Locally plentiful. On *Prunus spinosa** and *Crataegus*.*
- Ethmia decemguttella** Hübn. Tubney, larvae sometimes common. Hen Wood, one at light, 1895 (A.S.); one at light, 1899 (N.V.S.). Headington Wick Copse, larvae in 1919. On *Lithospermum officinale*.*

COLEOPHORIDAE.

- Metriotes modestella** Dup. Bagley Wood, one in 1924. Shot-over, 1924 (O.W.R.).† Forest Hill: common in Polecat End Lane. Among *Stellaria Holostea*.
- Coleophora spissicornis** Haw. [Cherbury Camp, 1920.] Hen Wood, 1901 (A.S., N.V.S.); recorded in error as *C. deauratella* (1901 list and Berkshire list). Kennington, 1925. Holton Pits, 1925. Otmoor, 1928. Taken singly in each instance.
- C. deauratella** Zell. Holton Pits, one in 1925. Hell Coppice, single examples in 1921 and 1922.
- C. frischella** Linn. Kennington, one captured on July 8th, 1925, in freshly emerged condition, among *Melilotus officinalis*.
- C. albitarsella** Zell. Tubney Wood, larval cases found on tree trunks. Cothill. Boar's Hill, 1915. Bagley Wood. North and South Hinksey. Forest Hill: on the north-west side of Holton Wood, larvae found in 1922. On *Nepeta hederacea** and *Clinopodium vulgare*.*
- C. alcyonipennella** Koll. Headington Hill, one in 1920 (A.W.P.-C.). Hell Coppice, not uncommon. On *Centaurea nigra** and exceptionally *Cirsium lanceolatum*.*
- C. potentillae** Staint. Forest Hill: near Holton Wood and in Polecat End Lane. Waterperry Wood. Hell Coppice. The larvae are usually abundant, and the moth is occasionally found on the wing. On *Agrimonia Eupatoria*.* *Potentilla erecta*,* *P. reptans*,** *Rubus caesius*,* *R. fruticosus*,* *Spiraea Filipendula*,** *S. Ulmaria*,** *Prunus spinosa*,* *Corylus*** and *Crataegus***. Cf. Ent. Mo. Mag., LXIV, 1928, p. 77.

- C. paripennella** Zell. Shotover. Waterperry Wood. Hell Coppice. Fairly common in the larval stage in its localities, but not noticed on the Berkshire side of the Thames. On *Pyrus Malus*,* *Prunus spinosa*,* *Crataegus*,* *Corylus*,* *Ulmus** and *Betula alba***.
- C. fuscocuprella** Herr.-Schäff. Tubney Wood, larvae fairly common in one small area; first noticed in 1926. Hell Coppice, one larva found in 1927. On *Corylus Avellana*.*
- C. nigricella** Steph. Common. On *Crataegus*,* *Pyrus Malus*,* *Prunus spinosa*,* *P. insititia*** and *P. avium*** (Shotover). In 1924 a larva was found on *Cotoneaster frigida*** in the University Parks.
- C. siccifolia** Staint. Cothill, one larva found on September 16th, 1924. On *Betula alba***.
- C. gryphipennella** Bouché. Common. On *Rosa canina*,* *R. arvensis** and cultivated roses.**
- C. orbitella** Zell. Cothill. Boar's Hill: above Chilswell. Bagley Wood, one larva in 1924. Wytham Woods. Oxford: in the University Parks. Waterperry Wood. Widely distributed, sometimes common in the larval stage. On *Betula*.*
- C. binderella** Koll. Cothill. Bagley Wood. Waterperry Wood. Hell Coppice. Locally plentiful. On *Alnus glutinosa** (Cothill) and *Corylus Avellana*.* Cf. Ent. Mo.Mag., LXIII, 1927, pp. 99 and 183.
- C. viminetella** Zell. Tubney Wood and Warren. Cothill. Bagley Wood. Kennington, larvae on leafy willow stumps used as field-posts (O.W.R.).† Yarnnton. Wolvercote. Marston Ferry. Waterperry Wood. Hell Coppice. Rather common. On *Salix cinerea*,* *S. Caprea*,* *S. fragilis** and *S. triandra*** ; exceptionally on *Betula** (Cothill).
- C. fuscadinella** Zell. General and abundant. On *Ulmus*,* *Alnus glutinosa*,* *Betula*,* *Corylus** and *Carpinus***.
- C. lutipennella** Zell. Plentiful in woods. On *Quercus Robur*.*
- C. limosipennella** Dup. Tubney Wood. Cothill. Bagley Wood. Waterperry Wood. Hell Coppice. Local, but sometimes plentiful. On *Ulmus*** (Hell Coppice) and more commonly on *Betula alba*.* Cf. Ent. Mo.Mag., LXIII, 1927, p.182.
- C. badiipennella** Dup. Bagley Wood. Kennington, one in 1925. Headington Hill, frequent on fences beneath elms in rough weather. Headington: one in a stone-pit above

- Bullingdon Bog, 1925. Hell Coppice. On *Ulmus** (Bagley) and *Prunus spinosa** (Hell Coppice). Cf. Ent. Mo. Mag., LXIII, 1927, p. 183.
- C. solitariella** Zell. Tubney. Shotover, blotches made by the larva seen in 1924. On *Stellaria Holostea**.
- C. laricella** Hübn. Tubney. Cothill. Hen Wood, 1896 (N.V.S.). Bagley Wood. Wytham Woods. Headington Hill, 1918 (A.W.P.-C.). On *Larix**; a pest in plantations.
- C. juncicolella** Staint. Boar's Hill: in the Youlbury grounds. Bladon Heath, locally common. On *Calluna vulgaris***.
- C. lixella** Zell. Holton Pits, one captured on June 22nd, 1924 (O.W.R.); a larva found in the same spot on May 5th, 1925. On *Briza media***.
- C. albidella** Herr.-Schäff. Tubney Warren, one larva in 1926. Cothill. Boar's Hill, 1915. Bagley Wood, one bred in 1927 (O.W.R.).† Waterperry Wood. Oxford district, ten specimens dated 1898-1902 (W.G.P.-S.). Found in plenty in the larval stage. On *Salix cinerea** and exceptionally *Betula** (O.W.R.). Cf. Ent. Mo. Mag., LXIV, 1928, p. 32.
- C. anatipennella** Hübn. Cothill. Boar's Hill. Kennington. Hinksey Hill, one on a fence, 1922. South Hinksey: in the Happy Valley. East Oxford, one at light, 1898 (A.H.H.); one bred from a case found on garden apple, 1900 (A.H.H.). Hell Coppice. The larvae are locally plentiful. On *Prunus spinosa**, *P. insititia***, *Crataegus** and *Pyrus Malus**.
- C. ardeipennella** Scott. Bagley Wood, one captured in 1920; larval cases found in 1920 and 1928. On *Quercus Robur***.
- C. betulella** Hein. Cothill. Boar's Hill: above Chilswell. Hen Wood, plentiful in 1899 and 1901 (A.S., N.V.S.). Bagley Wood (O.W.R.). Oxford: in the University Parks. Hell Coppice, one larva in 1928. At present it is found very sparingly, and chiefly in the larval stage. On *Betula**.
- C. palliatella** Zinck. Tubney Wood. Bagley Wood and Kennington. Waterperry Wood. Hell Coppice. Fairly common in woods. On *Quercus Robur**.
- C. discordella** Zell. South Hinksey, one captured in 1912. Hell Coppice, two larvae in 1927. On *Lotus uliginosus***.

- C. albicosta** Haw. Tubney. Boar's Hill. Cumnor Hurst. Shotover, 1924 (O.W.R.).† Locally common, among *Ulex europaeus*.
- C. lineolea** Haw. Cothill, one in 1912. South Hinksey, one in 1915. Hell Coppice, two in 1925.
- C. crocogramma** Zell. Foxcombe Hill, one in 1915. At the top of Hinksey Hill, larvae found by the roadside, 1924. Along the Canal from Yarnton to Oxford. North and East Oxford, on waste ground and land awaiting the builder. Waterperry Wood. The larvae are often plentiful. On *Ballota nigra*,* *Stachys sylvatica*,* *S. officinalis*,* and exceptionally *Lamium album*** (teste A.H.H.).
- C. troglodytella** Dup. Tubney, one in 1913. Cothill, locally common. Boar's Hill, one in 1915. South Hinksey, one in 1915. Headington Hill, one in 1917 (A.W.P.-C.). On *Eupatorium camabinum** (Cothill).
- C. therinella** Tengst. Tubney. Boar's Hill, one larval case found on a fence, 1923. Kennington. Wytham Woods, one captured in 1925. Along the north-west side of Holton Wood. Hell Coppice. On waste ground and the edges of fields. Larvae common in 1925. On *Cirsium arvense*.*
- C. argentula** Zell. Tubney, one larva on January 25th, 1925. Cumnor, in a stone-pit, fairly common. On *Achillea Millefolium*.*
- C. laripennella** Zell. Tubney. Cothill, larvae plentiful on a fallow piece of field, 1927. Foxcombe Hill and Boar's Hill. Hen Wood, 1899 and 1903 (N.V.S.). Kennington, 1920. North Hinksey, 1913. North Oxford, on waste ground. Rather common. On *Atriplex patula** and *Chenopodium album***.
- C. murinipennella** Dup. Cothill. In a meadow below Hen Wood, 1925. Bagley Wood. South Hinksey, 1914. Wolvercote, 1928. In a meadow between Bayswater Mill and Forest Hill, common in 1927. Holton Pits, 1927. Waterperry Wood, one in 1927. Hell Coppice. Frequent in meadows, though absent from many likely spots; scarce in woods. Among *Juncoides campestre*. Cf. Ent.Mo.Mag., LXV, 1929, p.3.
- C. tamesis** Waters. Binsey: common in a ditch and meadow by the Thames; first found in 1914, but not recognized as a distinct species till 1925. Otmoor, 1928. Quite recently described as new, and not at present known to occur elsewhere. Cf. Ent.Mo.Mag., LXV, 1929, p. 1.

- C. galactaula** Meyr. Tubney Warren, 1926. Cothill, larvae frequent on alder stems. South Hinksey. Binsey. Headington Hill, one on a fence, 1922. Waterperry Wood. Hell Coppice. Rather common. On *Juncus articulatus** and exceptionally *J. conglomeratus***. Cf. Entom., LXI, 1928, p.91.
- C. glaucicolella** Wood. Cothill. Boar's Hill. Bagley Wood, 1924 (O.W.R.).† Kennington: abundant in low-lying meadows. South Hinksey. Near Kirtlington, 1927 (O.W.R.).† Oxford. Bullingdon Bog. Shotover. Otmoor. Hell Coppice. Probably everywhere, but cannot be distinguished from the next species except by the genitalia; specimens from the localities mentioned have been identified by Mr. Richards. On *Juncus inflexus**, *J. articulatus** and other species. Cf. Ent. Mo. Mag., LXIV, 1928, p. 47.
- C. caespititiella** Zell. Boar's Hill: Tommy's Heath, bred in 1924 (O.W.R.).† Bagley Wood (O.W.R.).† Kennington. Waterperry Wood. Hell Coppice. Abounds everywhere among rushes, but owing to the danger of confusion with *C. glaucicolella* only the verified localities are here given (teste O.W.R.). On *Juncus conglomeratus**, *J. effusus**, *J. inflexus** and *J. articulatus**. Many larval cases found on *J. articulatus* at Hell Coppice in the autumn of 1924 were unusually dark, but produced typical imagines. Cf. Ent.Mo.Mag., LXIV, 1928, p.47.
- C. agrammella** Wood. Boar's Hill, one in 1915. Bagley Wood, scarce. Northleigh Heath, 1919. Stanton St. John Wood, larvae common in 1924. Hell Coppice. On *Juncus conglomeratus** and *J. effusus**. Imagines captured in the open have been identified by the genitalia (teste O.W.R.). Cf. Ent.Mo.Mag., LXIII, 1927, p. 101.

GRACILARIADAE.

- Lithocolletis roboris** Zell. Bagley Wood, four captured in one spot, May 31st, 1921; one bred from the same locality, 1923. On *Quercus Robur*.*
- L. cramerella** Fabr. Common. On *Quercus Robur*.* A striking variety, unicolorous white except for the dark apical hook, was bred in 1924 from Hitch Copse.
- L. heegeriella** Zell. Bagley Wood, scarce. Waterperry Wood and Hell Coppice, locally common. On *Quercus Robur*.*

- L. messaniella** Zell. Common. On *Quercus Ilex** (abundant in Oxford), *Q. Turneri** (Bagley Wood), *Castanea sativa** (Tubney Wood, Wytham Woods and Shotover) and *Carpinus Betulus** (Wytham Woods and Village, and in the University Parks and neighbouring gardens, Oxford).
- L. quercifoliella** Zell. Very common. On *Quercus Robur*.*
- L. alnifoliella** Dup. Tubney Wood. Hitch Copse. Cothill. Bagley Wood. Plentiful. On *Alnus glutinosa*.*
- L. ulicicolella** Staint. Tubney Wood. Cumnor Hurst. Locally common, among *Ulex europaeus*.
- L. carpinicolella** Staint. Wytham Woods. Oxford: in the University Parks. Prattle Wood, 1928. Local. On *Carpinus Betulus*.*
- L. coryli** Nic. Common. On *Corylus Avellana*.*
- L. faginella** Zell. Common. On *Fagus sylvatica*.*
- L. spinicolella** Zell. Common. On *Prunus spinosa*.*
- L. cerasicolella** Herr.-Schäff. Tubney Wood, mines found in 1928. Boar's Hill: one mine in the Youlbury grounds, 1928. Bagley Wood, one captured in 1922. Wytham Woods. Shotover, larvae sometimes common. On *Prunus avium*.* The first two of the above records require confirmation.
- L. sorbi** Frey. Shotover: on trees planted in the University Enclosure, a few bred in 1924-25. On *Pyrus Aucuparia*.*
- L. mespilella** Hübn. Oxford: a few bred in 1924 and 1926 from mines found in the University Parks. On *Pyrus Aucuparia*.*
- L. concomitella** Banks. Common. On *Pyrus Malus**, both wild and in gardens.
- L. blancardella** Fabr. Bagley Wood. North Oxford: in my garden. Shotover. Shabbington Wood. Many bred in 1924-25. On *Pyrus Malus*.*
- L. oxyacanthae** Frey. Common. On *Crataegus**, including the North American *C. punctata** planted in the University Parks.
- L. lantanella** Schranck. Tubney Wood. Cothill. Bagley Wood. Wytham Woods, mines seen in 1928. Locally common, but noticed on the Berkshire side only. On *Viburnum Lantana** and exceptionally *V. Opulus***
- L. salicicolella** Sirc. Common. On *Salix cinerea** and *S. Caprea*.*

- L. viminetorum** Staint. Marston Ferry, ten examples bred in 1924. On *Salix viminalis*.*
- L. cavella** Zell. Tubney, one bred in 1924, determined by the genitalia (*teste* W. Petersen); another in 1929. On *Betula alba*.*
- L. spinolella** Dup. Tubney Wood. Cothill. Boar's Hill. Bagley Wood. Wytham Woods. Bladon Heath, 1927. Waterperry Wood. Hell Coppice, 1921. Locally plentiful. On *Salix Caprea** and *S. cinerea*.*
- L. ulmifoliella** Hübner. Common. On *Betula*.*
- L. strigulatella** Zell. Cothill, bred in plenty in January, 1929, from leaves collected in October, 1928. Not previously found in this country. On *Alnus incana*.* Evidently introduced with the tree, but likely to remain.
- L. lautella** Zell. Waterperry Wood. Hell Coppice. Very local, and not noticed on the Berkshire side. On *Quercus Robur*.*
- L. schreiberella** Fabr. Common, although the imago is not often observed. On *Ulmus*.* An example with the ground colour bronzy-fuscous instead of golden was captured on a fence at Headington Hill, July 27th, 1925.
- L. trifasciella** Haw. Common. On *Lonicera Peri-Clymenum*.*
- L. emberizipennella** Bouché. Boar's Hill: one captured in Powderhill Copse on May 25th, 1915. 'Occurs at Oxford' (Nat. Hist. Tin., II, p. 308).
- L. tristrigella** Haw. Cothill, in elm hedges. Bagley Wood. Godstow Holt, one in 1922. Headington Hill, on fences. Shotover. Locally common. On *Ulmus*.*
- L. stettinensis** Nic. Cothill, locally common. Bagley Wood. On *Alnus glutinosa*.*
- L. froelichiella** Zell. Hitch Copse, 1919. Cothill, locally common. Bagley Wood. On *Alnus glutinosa*.*
- L. Nicelli** Staint. Common. On *Corylus Avellana*.*
- L. kleemannella** Fabr. Cothill, frequent. Bagley Wood. On *Alnus glutinosa*.*
- L. viminiella** Staint. Tubney. Cothill. North Hinksey, 1915. Godstow. Yarnton. Oxford: in the University Parks. Marston Ferry. Locally plentiful. On *Salix cinerea*,* *S. viminalis*,* *S. fragilis*,* *S. triandra*,* and a dark-leaved species planted in the University Parks (1923).*
- L. corylifoliella** Haw. Common. On *Crataegus*,* *Pyrus Malus*,* *P. Aucuparia*,** *P. communis*,* *P. torminalis** and *Prunus avium*.* In the University Parks a mine of this species was found in 1924 in a leaf of *Cotoneaster frigida*.**

- L. comparella** Zell. Cothill. Hinksey Hill, 1923. Oxford: in the University Parks. Ifley, 1923 (A.H.H.). Locally common. On *Populus canescens**; in the University Parks also on *P. Tacamahacca*.*
- L. hortella** Fabr. Tubney Wood. Hitch Copse. Powderhill Copse near Hen Wood, 1902 (A.S., N.V.S.). Bagley Wood, 1902 (A.S., N.V.S., W.M.G.). Locally plentiful; found on the Berkshire side only. On *Quercus Robur*.*
- L. sylvella** Haw. Cothill, 1924. Bagley Wood. Hinksey Hill, larvae by the road-side. South Hinksey: one captured in the old Rifle Range, 1915. Wytham Woods, 1924. Between Kirtlington and Weston-on-the-Green, larvae seen in 1928. In Brasenose Lane under Shotover. Widely distributed, but common only in the last-mentioned locality. On *Acer campestre*.*
- L. geniculella** Rag. Tubney Wood, sometimes plentiful. Cothill. Hen Wood, larvae in 1928. Bagley Wood, locally common. Wytham Woods. Bladon Heath, mines seen in 1927. On *Acer Pseudo-platanus*.* This species was not recognized as British till 1925, when many examples were bred from Tubney larvae. It appears to be on the increase. Cf. Ent. Mo. Mag., LXI, 1925, p. 193, and LXIV, 1928, p. 12.
- Phyllocnistis saligna** Zell. Tubney. Cothill, mines and cocoons, 1928. Bagley Wood, 1919. Godstow Holt, 1925. Between Kirtlington and Weston-on-the-Green, 1928. Stanton St. John Wood. Frequent in thatch, and flies among willows. On *Salix fragilis*** (Cothill).
- P. suffusella** Zell. Very common. On *Populus deltoidea**, *P. italica** and *P. Tacamahacca***. Imagines of the summer brood usually have the basal half of the forewings pure white, or with a faint dorsal spot only.
- Acrocercops omisella** Staint. Cothill. Foxcombe Hill, 1915. North Oxford, on waste ground and land awaiting the builder. Shotover, larvae seen in 1924. Rather common, though the moth is seldom observed. On *Artemisia vulgaris*.*
- A. brongniardella** Fabr. Tubney. Boar's Hill, one in 1920. Bagley Wood, larvae plentiful. Headington Hill, on a fence, 1925. Stanton St. John Wood. Often abounds in thatch. On *Quercus Robur*.*
- Parectopa ononidis** Zell. Hell Coppice, eight examples captured since 1922; all in one meadow, flying in afternoon or evening sunshine.

- Ornix guttea** Haw. Tubney and Cothill, traces of the larva seen. Boar's Hill, 1897 (A.S.). Bagley Wood. South Hinksey. Oxford, in gardens. Weston-on-the-Green, larval habitations seen, 1928. Shotover. Hell Coppice. Rather common. On *Pyrus Malus*.*
- O. anglicella** Staint. Common. On *Crataegus*.*
- O. avellanella** Staint. Common. On *Corylus Avellana*.*
- O. torquillella** Zell. Common. On *Prunus spinosa** and *P. insititia*.**
- O. scoticella** Staint. North Oxford: in my garden. The University Parks. Waterperry Wood. Shabington Wood. On *Pyrus Aucuparia** and *P. torminalis**; in the University Parks it is plentiful also on *Cotoneaster frigida*.*
- O. betulae** Staint. Cothill. Boar's Hill: above Chilswell. Wytham Woods, larvae seen in 1928. Headington Hill, 1921 (A.W.P.-C.). Waterperry Wood. Hell Coppice. Rather common. On *Betula*.*
- Cracilaria auroguttella** Steph. General among its food-plant, sometimes plentiful. On *Hypericum perforatum*.*
- C. phasianipennella** Hübn. Cothill, one on October 15th, 1922; another on September 27th, 1924; both disturbed from dense herbage in meadows.
- C. syringella** Fabr. Common, especially in Oxford gardens. On *Ligustrum vulgare**, *Fraxinus excelsior** and *Syringa vulgaris*.*
- C. cuculipennella** Hübn. Tubney Wood. Cothill. Bagley Wood. Wytham Woods. Bladon Heath. Stanton St. John Wood. Holton Wood. Hell Coppice. Rather common in woods. Frequent in thatch.
- C. sulphurella** Haw. Bladon Heath, two examples captured in 1912 and 1913.
- C. tringipennella** Zell. Common on rough open ground. On *Plantago lanceolata*.*
- C. elongella** Linn. Cothill. Hen Wood. Bagley Wood. Bladon Heath. Waterperry Wood. Hell Coppice. Rather common. On *Alnus glutinosa** and *Betula*.*
- C. alchimiella** Scop. Common. On *Quercus Robur*.*
- C. stigmatella** Fabr. Tubney. Cothill. Bagley Wood. Wytham Woods. Godstow, 1913. Headington Hill, 1918 (A.W.P.-C.). Stanton St. John Wood. Rather common. On *Populus tremula** and *Salix cinerea*.*

EPERMENIADAE.

- Cataplectica fulviguttella** Zell. Cothill. Bagley Wood. North and South Hinksey. Yarnton. Among *Umbelliferae*, sometimes plentiful.
- Epermenia illigerella** Hübn. Tubney, 1911. Cothill. South Hinksey: in the old Rifle Range. Bullingdon Bog. In marshy meadows, local.
- E. chaerophyllella** Göze. Common. On *Heracleum Sphondylium** (O.W.R., Kirtlington, 1927),† *Anthriscus sylvestris** and *Angelica sylvestris*.*

PLUTELLIDAE.

- Orthotaelia sparganella** Thunb. Binsey: in a ditch by the Thames. Marston Fields, 1899 (A.S., N.V.S., W.G.P.-S., W.M.G.). Very local, but occurs in plenty.
- Cerostoma caudella** Linn. Tubney. Cothill, one in 1915 (J.J.W.). Bagley Wood, one in 1902 (N.V.S.). Finstock, 1919. Wood Eaton, one at ivy bloom, 1902 (N.V.S.). Oxford district, two specimens dated 1902 and 1903 (W.M.G.). Local and rather scarce. Found in thatch and among *Euonymus europaeus*.
- C. xylostella** Linn. Common. On *Lonicera Peri-Clymenum*.*
- C. scabrella** Linn. Boar's Hill. Bagley Wood. Wytham Woods, on old hawthorns. North Oxford, in hedges, 1928. Headington Hill, 1917 (A.W.P.-C.). Weston-on-the-Green, one in 1928. Hell Coppice, 1928. Widely distributed, but not common.
- C. horridella** Treits. Bagley Wood, a dozen bred, 1899-1902 (N.V.S., A.S., W.G.P.-S.). Hell Coppice, one in 1920, another in 1928. On *Prunus spinosa*.*
- C. lucella** Fabr. Hen Wood, one at sugar, 1901 (N.V.S.). Bagley Wood, many specimens dated 1897-1901 (A.S., N.V.S., W.G.P.-S.); it still occurs there. Waterperry Wood. Local, among oak.
- C. alpella** Schiff. Tubney Wood, one in 1919. Bagley Wood. Wytham Woods, one in 1913. Waterperry Wood. Frequent. On *Quercus Robur*.*
- C. sylvella** Linn. Tubney Wood. Bagley Wood. Wytham Woods. Waterperry Wood. Hell Coppice. Rather common in oak woods.
- C. costella** Fabr. Common. On *Quercus Robur*.*
- C. radiatella** Don. Common. On *Quercus Robur*.*

- C. sequella** Clerck. Tubney Wood, on sycamore trunks. Hen Wood, one in 1902 (W.M.G.). Bagley Wood. Wytham Woods, one in 1919. [Finstock.] Between Kirtlington and Weston-on-the-Green, one in 1928. Frequent, usually found on tree trunks.
- C. vittella** Linn. General among elm.
- Plutella porrectella** Linn. South Hinksey: one in the old Rifle Range, 1920. North Oxford, frequent in gardens. Marston fields, 1897 (A.S. and N.V.S. diaries).† Bul-lington Bog, one in 1921 (A.H.H.).
- P. maculipennis** Curt. Common.
- Acrolepia pygmaeana** Haw. Tubney. Cothill, larvae and mines found. Kennington, larvae found in 1924. Oxford, 1894 (A.S.); larvae in the University Parks. Headington Hill, one on a fence, February 6th, 1915 (H. Britten); one bred in 1917 from a larva found by H. Britten (A.W.P.-C.). Locally common; sometimes beaten from thatch. On *Solanum Dulcamara*.*

LYONETIADAE.

- Opostega salaciella** Treits. Kennington, one captured on July 8th, 1925.
- O. crepusculella** Zell. Bagley, one in 1920, among *Teucrium Scorodonia*. North Oxford, one in my study, attracted to light, 1920. Forest Hill: one in Polecat End Lane, 1925.
- Leucoptera laburnella** Staint. Tubney Wood, one in 1925. North Hinksey, 1913. Oxford and suburbs, abundant in gardens. On *Laburnum anagyroides*.*
- L. spartifoliella** Hübn. Cumnor Hurst, common among *Cytisus scoparius*.
- L. wailesella** Staint. Hell Coppice, sometimes plentiful. On *Genista tinctoria*.*
- L. scitella** Zell. Tubney Wood, mines found in 1925. Cothill. Bagley Wood. South Hinksey: above the old Rifle Range. Wytham Woods, 1928. Near Enslow Bridge and near Yarnton: in hedges by the Canal. Shotover. Otmoor, 1928. Widely distributed, but not very common. On *Pyrus Malus*,* *P. Aucuparia*** (Tubney) and *Crataegus*.*
- Lyonetia clerkella** Linn. Common. On *Pyrus Malus*,* *P. communis*,** *P. Aucuparia** (in the University Parks), *Crataegus*,* including *C. punctata*** (in the University

Parks), *Cotoneaster frigida** (do.), *Prunus spinosa*** *P. insititia**, *P. avium*** (Wytham Woods and Shotover) and *Betula***. The unicolorous dark form (ab. *aereella* Treits.) is at least as common as the typical form.

Bedellia somnulentella Zell. Bagley Wood, one captured on September 27th, 1919.

Tischeria complanella Hüb. Common. On *Quercus Robur**; in Wytham Woods also on *Q. Cerris***.

T. dodonaea Heyd. Tubney Wood. Cothill. Powderhill Copse. Bagley Wood. Wytham Woods. Waterperry Wood. Nearly as common as the preceding species. On *Quercus Robur**; in Wytham Woods also on *Q. Cerris*.*

T. marginea Haw. Common. On *Rubus fruticosus** and *R. idaeus*.*

T. angusticolella Dup. Waterperry Wood. Hell Coppice. Very local, but the larvae are found in plenty. On *Rosa canina*.*

Bucculatrix cristatella Zell. Cumnor Hurst, one in 1916. Holton Pits, one in 1925. Near Forest Hill: in a meadow by Holton Brook, 1921. Hell Coppice, frequent.

B. nigricomella Zell. Bagley Wood and Kennington. Yarn-ton railway embankment, larvae plentiful. By the Canal near Wolvercote, 1899 (A.H.H.). Waterperry Wood. Hell Coppice. Rather common. On *Chrysanthemum Leucanthemum*.*

B. frangulella Göze. Cothill, specially plentiful in the larval stage. Between Kirtlington and Weston-on-the-Green, mines seen in 1928. On *Rhamnus catharticus*.*

B. boyerella Dup. Tubney, one in 1913. Oxford: in the University Parks, one in 1925. Headington Hill, frequent on fences. Shotover, mines found, 1924. Hell Coppice. On *Ulmus***.

B. cidarella Zell. Cothill, very local but occasionally plentiful. On *Alnus glutinosa***.

B. ulmella Zell. Tubney Wood, a cocoon found in 1922 and mines in 1927. Boar's Hill: Red Copse, one in 1915. Waterperry Wood, occasional. On *Quercus Robur***.

B. crataegi Zell. Tubney, one in 1921. Cothill, 1923. Waterperry Wood. Hell Coppice, sometimes common. Shab-bington Wood, 1923. On *Crataegus*.*

B. demaryella Staint. Waterperry Wood, larvae and mines found sparingly. On *Betula alba***.

Oinophila v-flava Haw. Oxford: in New College wine-cellar about 1910, when its ravages necessitated the re-bottling of the College port (*teste* N.V.S.). In the cellars of the 'Mitre' I have seen corks of champagne-bottles mined by the larvae.

TINEIDAE.

Trichophaga tapetiella Linn. Tubney, in thatch, 1924. Cot-hill, in an outhouse, 1927. Oxford district, one in 1904 (W.M.G.).

Monopis rusticella Hübn. Common, though the next species is often mistaken for it. Tubney, sometimes plentiful in thatch. Oxford, in and near houses. Bred in plenty from the nests of various birds, found at Oxford and Headington by A. H. Hamm, 1925-28.

M. weaverella Scott. Cothill. Bagley Wood. Waterperry Wood. Hell Coppice. Many 'Oxford district' specimens in the Sidgwick, Pogson-Smith and Geldart collections. Frequently captured in woods.

Tineola biselliella Hüm. Oxford and suburbs, common in houses.

Tinea fulvimitrella Sodof. Bagley Wood, one in 1904 (W.M.G.); locally common on oak trunks in 1921. Waterperry Wood, one on an oak trunk, 1921.

T. arcella Fabr. Tubney, 1927. Hen Wood, 1901 (A.S.). Bagley Wood and Kennington. Oxford, one in 1926.

T. corticella Curt. Bagley Wood, locally common. Waterperry Wood, one seen in 1922. Found on oak trunks.

T. parasitella Hübn. Tubney Wood. Bagley Wood. Wytham Woods. Locally common. Found on tree trunks.

T. granella Linn. Oxford: a few in the Castle Mill, 1915. Oxford district, one in 1902 (W.M.G.).

T. cloacella Haw. Common.

T. misella Zell. Tubney, two obtained from thatch, 1923. North Oxford: one found in my house, 1915.

T. fuscipunctella Haw. Oxford, frequent in houses.

T. flavescentella Haw. Oxford: many bred in 1926 from the remains of a dead pigeon found in the University Parks.

T. pellionella Linn. Common in houses. Bred from a hedge-sparrow's nest found at Headington by A. H. Hamm, 1926.

- T. pallescentella** Staint. Oxford, common in houses; found in the University Museum and in the cellars of the 'Mitre.'
- T. lapella** Hübn. Common. Bred in plenty from various birds' nests found at Oxford and Headington by A. H. Hamm.
- T. semifulvella** Haw. Cothill, 1922. Hen Wood, 1896-99 (A.S., N.V.S.). Bagley Wood. Bladon Heath, 1912. Oxford and Headington Hill, on fences. Fairly common.
- Ochsenheimeria birdella** Curt. Tubney, three captured in 1906 (A.H.H.). North Hinksey, seen in 1913. Bullington Bog, one in 1908 (A.H.H.). Usually found on the ground among grass.
- O. vacculella** Fisch. v. Rösl. Lye Hill, near Cowley, two examples found under loose bark, July 20th, 1918 (A.H.H.).
- Talaeporia pseudobombycella** Hübn. Tubney Wood, larvae and empty cases on tree trunks and stone walls. Cothill, larvae locally plentiful; bred in numbers in 1923. Bagley Wood, cases on tree trunks.
- Solenobia lichenella** Linn. Tubney, larvae not uncommon on a stone wall; many examples bred in 1924 were all females. Regarded by Mr. Meyrick (Handbook, p. 835) as the parthenogenetic form of *S. inconspicua* Staint.
- Luffia ferchaultella** Steph. Tubney Wood, on oak trunks. Cothill, on trunks of *Populus canescens* and alder. Bagley Wood, on trunks of oak, *Pyrus communis* and *Pinus Abies*. Kennington, on field posts. Dorchester, on an old lichen-covered tombstone and on the church wall, 1922. Yarnton, on an open fence. Oxford: in the University Parks, on trunks of *Populus italica*. Often very abundant. Only females have been bred. Perhaps a parthenogenetic form of *L. lapidella* Göze (Meyrick's Handbook, p. 836).
- L. sepium** Spey. Bagley Wood, a larva found on February 25th, 1923, and a case in 1926; both on oak trunks. Kennington, nine specimens bred in 1925 from larvae found on field posts (O.W.R.). Oxford: a larva found in a room at Exeter College, November 16th, 1923; probably introduced with fire-wood.
- Narycia melanella** Haw. Tubney. Bagley Wood and Hinksey Hill. Wytham Woods. Oxford: on the south side of the University Parks; one captured on Magdalen Bridge, 1907 (A.H.H.). Headington Hill, on fences. The larvae are frequently met with on tree trunks, fences and stone walls.

- N. marginepunctella** Steph. Yarnton, one full-fed larva found on a post, July 13th, 1922, but not reared.

LAMPRONIADAE.

- Phylloporia bistrigella** Haw. Cothill. Bagley Wood. Waterperry Wood. Local. On *Betula*.**
- Incurvaria pectinea** Haw. Boar's Hill: in or near Powderhill Copse, two specimens captured in 1897 and 1898 (N.V.S.). Bagley Wood, one captured in 1896 (N.V.S.).
- I. muscalella** Fabr. Common.
- Lampronia capitella** Clerck. Oxford, one captured on May 31st, 1892 (A.S.); probably in his garden in North Oxford.
- L. oehmanniella** Treits. Cothill, one in 1920. Boar's Hill: above Chilswell, 1896 and 1898 (N.V.S.). Bagley Wood, 1898 (N.V.S.), 1905 (W.M.G.). Wytham Woods, one in 1896 (N.V.S.). Waterperry Wood. Hell Coppice, 1928. In woods, locally common.
- L. praelatella** Schiff. Cothill. Bagley Wood. Waterperry Wood. Hell Coppice. Shabbington Wood. In woods, local, sometimes plentiful.
- L. luzella** Hübn. Waterperry Wood. Hell Coppice. Local and found in small numbers.
- L. rubiella** Bjerck. Cothill, 1922. Godstow Holt, 1921. Cowley, among raspberry in a garden, 1924 (O.W.R.).† Hell Coppice, 1922 and 1923. A single example in each instance.
- L. quadripunctella** Steph. Boar's Hill: in or near Powderhill Copse, one captured on June 5th, 1896 (N.V.S.). Bagley Wood, one in 1901 (W.G.P.-S.); one in 1902 (W.M.G.).

ADELIDAE.

- Nemotois minimella** Zell. South Hinksey: in the old Rifle Range. Hell Coppice. Locally common. On *Scabiosa Succisa*.*
- N. cupriacella** Hübn. Bagley Wood, one captured on July 10th, 1900 (A.S.). Waterperry Wood, one in 1921. Hell Coppice, sometimes plentiful. On *Scabiosa Succisa*.* The specimens, captured and bred, are all females.
- N. degeerella** Linn. Common in woods, sometimes plentiful.

- Adela viridella** Scop. Very common. Among oak and hawthorn.
- A. croesella** Scop. Cothill, one in 1922. Bagley Wood, one in 1902 (N.V.S.). Wytham Hill, several in 1915. Shotover Plain, 1923 (O.W.R.).† Hell Coppice, one in 1921. Usually among privet.
- A. rufimitrella** Scop. Common in meadows and marshy places among *Cardamine pratensis*.
- A. fibrilella** Schiff. Tubney Wood. Boar's Hill or Hen Wood, 1903 (N.V.S.). Bagley Wood. South Hinksey: in the old Rifle Range, 1915. Local, among *Veronica Chamaedrys*.
- Nemophora swammerdammella** Linn. Common.
- N. schwarziella** Zell. Cothill. Hen Wood. Wytham Woods. Bladon Heath. Marston, 1897 (N.V.S.). Shotover. Waterperry Wood. Rather common.
- N. metaxella** Hübn. Cothill. Bagley Wood. Binsey, 1922. Wytham, 1904 (W.G.P.-S.). Yarnton. Waterperry Wood. Hell Coppice, 1923. Locally common in damp woods and copses.

NEPTICULINA.

NEPTICULIDAE.

- Nepticula pomella** Vaughan. Cothill. Boar's Hill. Bagley Wood. North Oxford, in gardens. Shotover. Forest Hill, 1922. Shabbington Wood. On *Pyrus Malus**; specially plentiful on cultivated apple.
- N. pygmaeella** Haw. Common, larvae often plentiful. On *Crataegus*.*
- N. atricapitella** Haw. Common. On *Quercus Robur*.*
- N. ruficapitella** Haw. Common. On *Quercus Robur*.* Inseparable in its early stages from the preceding species, but the genitalia prove it to be distinct (*teste* W. Petersen).
- N. basiguttella** Hein. Tubney Wood. Cothill, one mine in 1928. Wytham Woods, 1928. Bagley Wood. Waterperry Wood. Hell Coppice. Locally common. On *Quercus Robur*.*
- N. anomalella** Göze. Bagley Wood, bred in 1923. North Oxford, one bred from my garden, 1923. Hell Coppice, bred in 1924. Quite scarce in this district. On *Rosa canina** and cultivated rose.*

- N. Fletcheri** Tutt. Bagley Wood. South Hinksey, one in 1915. Forest Hill. Stanton St. John. Waterperry Wood. Hell Coppice. Locally plentiful. On *Rosa arvensis** and *R. canina*.* The genitalia prove it to be distinct from *N. anomalella* (teste W. Petersen).
- N. viscerella** Staint. Cothill. North Hinksey. Wytham. Oxford: in the University Parks. Shotover. Waterperry Wood. Hell Coppice. The larvae are locally plentiful. On *Ulmus*.*
- N. aucupariae** Frey. Oxford: in the University Parks. On *Pyrus Aucuparia*** and once (October 26th, 1923) on *Cotoneaster frigida***.
- N. minusculella** Herr.-Schäff. North Oxford: larvae fairly common in my garden, 1922-25. On *Pyrus communis*.*
- N. oxyacanthella** Staint. Common. On *Crataegus*,* including *C. punctata** (in the University Parks), *Pyrus Malus*,* *P. communis** (in my garden) and *Cotoneaster frigida** (in the University Parks).
- N. regiella** Herr.-Schäff. Cothill. Bagley Wood. Wolvercote. Oxford: in the University Parks; one captured in the University Museum, 1924. Marston Ferry. Waterperry Wood. Hell Coppice. Rather common. On *Crataegus*.*
- N. aeneofasciella** Herr.-Schäff. Common. Often abundant in the larval stage. On *Agrimonia Eupatoria*,* *Potentilla erecta** (Bagley Wood, Shotover, Hell Coppice), *P. reptans** (Bagley Wood, Wytham Woods) and *Fragaria vesca** (Bagley Wood and near Forest Hill).
- N. splendidissimella** Herr.-Schäff. Cothill. Yarnton railway embankment. Local. On *Rubus caesius** and *R. idaeus*.*
- N. aurella** Staint. Very common. On *Rubus fruticosus*,* *R. idaeus** (Cothill, 1922), *R. caesius*,* *Geum urbanum** and *Agrimonia Eupatoria*.* Examples bred from the three latter food-plants frequently have black heads, and have been assigned to *N. fragariella* Heyd. or *N. gei* Wocke; but their distinctness has yet to be demonstrated.
- N. dulcella** Hein. Mines agreeing with those of *dulcella* have been found repeatedly since 1923 in Bagley Wood, but always empty of larvae. On *Fragaria vesca*** Mr. Meyrick, however (Handbook, p. 854), regards *dulcella* as conspecific with *N. aurella*.
- N. poterii** Staint. Cothill, larvae sometimes plentiful on *Spiraea Ulmaria** and *Potentilla erecta*.* South Hinksey, larvae on *Spiraea Ulmaria*** Yarnton, one mine

found on *Spiraea Ulmaria*, 1922. The names *N. ulmariae* Wocke and *N. serella* Staint. have been given to imagines bred from *Spiraea Ulmaria* and *Potentilla erecta* respectively; but evidence that they are specifically distinct from *N. poterii* is not yet forthcoming. Cf. Ent. Mo. Mag., LX, 1924, p. 99.

- N. gratiosella** Staint. Cothill. Yarnton: by the Canal, 1928. Weston-on-the-Green, mines found, 1928. Hell Coppice. The larvae are locally common. On *Crataegus*.**
- N. ulmivora** Fologne. Bagley Wood. North Hinksey. Wytham. Shotover. Waterperry Wood. Hell Coppice. Widely distributed, and fairly common in its localities. On *Ulmus*.*
- N. marginicolella** Staint. Very common in the larval stage. The imago is sometimes found on fences. On *Ulmus*.*
- N. alnetella** Staint. Cothill, fairly common. Bagley Wood, one bred in 1925. On *Alnus glutinosa*.*
- N. continuella** Staint. Cothill, the mines are frequently found, though usually empty. Waterperry Wood, mines found. On *Betula pubescens*.*
- N. centifoliella** Zell. Cothill. Foxcombe Hill. Godstow. Oxford, abounds in gardens. Forest Hill. Stanton St. John. Hell Coppice. On *Rosa canina*,* *R. arvensis** and many kinds of cultivated rose.* Black-headed examples have been bred from Stanton St. John and Hell Coppice. Two empty mines, most probably of this species, were found on *Poterium Sanguisorba* near Stanton St. John, October 1st, 1924.
- N. microtheriella** Staint. Common, often plentiful. On *Corylus Avellana**; in Wytham Woods also on *Carpinus Betulus*.**
- N. betulicola** Staint. Tubney Wood. Cothill. Boar's Hill. Bagley Wood. Oxford: in the University Parks. Waterperry Wood. Often abounds in the larval stage. On *Betula alba** and *B. pubescens*.*
- N. plagicolella** Staint. Common. On *Prunus spinosa*,* *P. insititia** (Kennington) and *P. domestica*** (Cothill and Wolvercote).
- N. ignobilella** Staint. Cothill. Cumnor, 1916. Bagley Wood. Enslow, Yarnton and Wolvercote, in hedges by the Canal. Oxford: in the University Parks. Marston Ferry. Headington Hill: the imago occurs on fences. Weston-on-the-Green, 1928. Waterperry Wood. Otmoor, 1928. Hell Coppice. Rather common. On *Crataegus*.*

- N. glutinosae** Staint. Cothill, several examples captured and bred. On *Alnus glutinosa*.*
- N. luteella** Staint. Tubney Wood. Cothill. Boar's Hill, 1926. Bagley Wood. Wytham Woods, 1924. Oxford: in the University Parks. Waterperry Wood. Fairly common. On *Betula*.*
- N. woolhopiella** Staint. Tubney, 1928. Cothill. Boar's Hill. Oxford: in the University Parks. Waterperry Wood. Fairly common, but easily mistaken for the next species. On *Betula*.*
- N. argentipedella** Zell. Found wherever there is birch, and often abundant in the larval stage. On *Betula alba*.*
- N. basalella** Herr.-Schäff. Tubney Wood. Cothill, one mine in 1922. Bagley Wood. Wytham Woods. Between Kirtlington and Weston-on-the-Green, mines found in 1928. Rather common in the larval-stage. On *Fagus sylvatica*.*
- N. turicella** Herr.-Schäff. Common wherever its food-plant is found. On *Fagus sylvatica*.*
- N. malella** Staint. Cothill. Bagley Wood. Wytham Woods. Weston-on-the-Green, 1928. Shotover. Waterperry Wood. Shabbington Wood. Fairly common in the larval stage. On *Pyrus Malus** (wild only).
- N. atricollis** Staint. Cothill. Bagley Wood. South Hinksey. Wytham Woods. Shotover. Prattle Wood, 1928. Hell Coppice. Shabbington Wood. Locally plentiful in the larval stage. On *Crataegus** and *Pyrus Malus*.**
- N. angulifasciella** Staint. Cothill. Bagley Wood. Wytham Hill. Oxford: in gardens and in the University Parks. Prattle Wood, 1928. Holton Pits. Forest Hill: in Polecat End Lane. Waterperry Wood. Hell Coppice. In woods and gardens, often abundant. On *Rosa canina** and cultivated species.*
- N. rubivora** Wocke. Cothill. Bagley Wood. Wytham Woods. Between Binsey and Godstow. Yarnton railway embankment. Forest Hill: in Polecat End Lane. Hell Coppice. The larvae abound wherever the food-plant grows freely. On *Rubus caesius*.*
- N. arcuatella** Herr.-Schäff. Tubney Wood, mines found. Bagley Wood, larvae plentiful but very local. Wytham Hill, mines found in 1928. On *Fragaria vesca*.*
- N. salicis** Staint. Common. On *Salix cinerea*.* *S. Caprea** and perhaps other species.

- N. vimineticola** Frey. Cothill, 1928. Enslow, one mine in 1924. Oxford: larvae plentiful in the University Parks. Marston Ferry. Near Ifley, mines found in 1924 (A. H. H.). Weston-on-the-Green, mines found in 1928. Otmoor, mines found in 1928. On *Salix fragilis** and *S. triandra** (Marston Ferry, and near Ifley). The genitalia prove *N. vimineticola* to be distinct from *N. salicis* (teste W. Petersen).
- N. floslactella** Haw. Common. On *Corylus Avellana**; also on *Carpinus Betulus*** in Wytham Woods and the University Parks.
- N. lapponica** Wocke. Tubney Wood. Cothill. Bagley Wood. Wytham Woods. Oxford: in the University Parks. Waterperry Wood. Hell Coppice. Shalvington Wood. Larvae or empty mines have been noticed in many spots, but occur sparingly except at Cothill. On *Betula***.
- N. confusella** Wals. Cothill. Boar's Hill: above Chilswell. Bagley Wood. Wytham Woods. Oxford: in the University Parks. Waterperry Wood. Identified chiefly from the conspicuous empty mines, which are not scarce. On *Betula***.
- N. septembrella** Staint. General; larvae and cocoons often found in abundance. On *Hypericum perforatum*.*
- N. cathartice** Staint. Cothill. Boar's Hill. South Hinksey: in the Happy Valley. Between Binsey and Godstow. Oxford: in the University Parks. Marston Ferry. Holton Pits. Hell Coppice. Rather common. On *Rhamnus catharticus*.*
- N. intimella** Zell. Tubney Warren. Cothill. Boar's Hill, one in 1920. Wytham Woods, one in 1915. Yarnton, 1928. Waterperry Wood. Hell Coppice. The larvae are locally common. On *Salix cinerea*.*
- N. quinquella** Bed. Tubney Wood. Hitch Copse. Local, but found abundantly in the larval stage. On *Quercus Robur*.*
- N. trimaculella** Haw. Bagley Wood. Kennington. Wytham. Oxford. Shotover. Otmoor, 1928. Rather common. On black poplar,* *Populus Tacamahacca***, and abundant in the University Parks on *P. italica*.*
- N. assimilella** Zell. Cothill, on *Populus canescens*.* Bagley Wood, on *P. tremula***. Waterperry Wood, on *P. tremula***. Very local, but the larvae are not scarce. Cf. Ent. Mo. Mag., LXIV, 1928, p. 219.

- N. subbimaculella** Haw. General and abundant. On *Quercus Robur*.*
- N. albifasciella** Hein. Tubney Wood, bred from larvae in 1928; on the strength of these specimens it was placed for the first time on the British list. The mines had been distinguished from those of *N. subbimaculella* a few years earlier. In the autumn of 1928 the larvae were found also at Cothill, and in Bagley, Wytham and Prattle Woods. On *Quercus Robur*.* Cf. Ent. Mo. Mag., LXIV, 1928, p. 248.
- N. argyropeza** Zell. Bagley Wood. Prattle Wood, 1928. Waterperry Wood. Shabbington Wood, one in 1922. Locally plentiful. On *Populus tremula*.*
- N. pulverosella** Staint. Cothill. Bagley Wood. Wytham Woods. Weston-on-the-Green, 1928. Shotover. Waterperry Wood. Shabbington Wood. The larvae and empty mines are found rather commonly, chiefly in woods. On *Pyrus Malus** (wild only).
- Trifurcula atrifrontella** Staint. Tubney Wood, two examples captured on September 10th, 1920.
- T. immundella** Zell. Foxcombe Hill, in gardens. Cumnor Hurst, fairly common. Among *Cytisus scoparius*.
- Scoliaula quadrimaculella** Boh. Cothill, several examples captured in 1922 and 1925. Among *Alnus glutinosa*.

MICROPTERYGINA.

HEPIALIDAE.

- Hepialus hectus** Linn. Common.
- H. lupulinus** Linn. Very common.
- H. velleda** Hübn. Bagley Wood, one captured in 1924 (O.W.R.).† Recorded from Woodstock by C. Rippon in the Oxfordshire list.
- H. sylvinus** Linn. Hen Wood, 1902 (N.V.S. Diary).† Bagley Wood, 1900 (A.S. and N.V.S. diaries).† North Oxford, occasional. Headington Hill, two in 1918 (A.W.P.-C.). Marston, 1900 (N.V.S.). Oxford district, four specimens dated 1896-1900 (W.G.P.-S.).
- H. humuli** Linn. Common.

MICROPTERYCIDAE.

- Eriocrania semipurpurella** Steph. Cothill. Boar's Hill: above Chilswell, plentiful. Among birch.

- E. Sangi** Wood. Cothill (?). Boar's Hill: above Chilswell. Bagley Wood, two in 1899 (W.G.P.-S.) (?). Among birch. It is possible that more than one species is included under this name; but undoubted examples of *Sangi* have been captured at Boar's Hill.
- E. purpurella** Haw. Cothill. Boar's Hill. Bladon Heath, 1915. Common among birch.
- E. salopiella** Staint. Boar's Hill: above Chilswell, one example captured on April 22nd, 1913. Among birch.
- E. sparmannella** Bosc. Cothill, larvae found in 1928. Boar's Hill: above Chilswell. Bagley Wood, 1899 (W.G.P.-S.); larvae found in 1928. On *Betula alba*.**
- Mnemonica unimaculella** Zell. Cothill, one example captured on April 21st, 1924. Among birch.
- M. subpurpurella** Haw. Common. On *Quercus Robur*.**
- Micropteryx thunbergella** Fabr. Cothill, 1923. Bagley Wood, often plentiful. South Hinksey: one in the old Rifle Range, 1912. Wytham Woods, 1897 and 1900 (A.S.).
- M. mansuetella** Zell. Tubney Wood, one in 1920. Boar's Hill: Powderhill Copse. Bagley Wood, locally plentiful. South Hinksey, one in 1915. Waterperry Wood, 1923. Hell Coppice.
- M. aruncella** Scop. Cothill. Boar's Hill. Bagley Wood. Yarnton. Wolvercote. Shotover, 1899 (A.H.H.), 1922 (O.W.R.).† Holton Pits. Waterperry Wood. Rather common.
- M. calthella** Linn. General and abundant, in woods and copses. On this species, *M. thunbergella* and *M. aruncella*, see O. W. Richards in Ent. Mo. Mag., LIX, 1924, p. 31.

APPENDIX

The undermentioned insects, recorded as occurring in the Oxford district, have not been admitted into the foregoing list. The reasons for their exclusion, final in some cases, purely temporary (we may hope) in others, are briefly stated in each instance. Only published records have been taken into account.

PYRALIDINA.

PHYCITIDAE.

Homoeosoma cretacella Rössl. Recorded as *H. senecionis* Vaughan in the Berkshire List (*teste* A.S.). An error of identification; the specimens are *H. binaevella* Hübn.

PYRAUSTIDAE.

Diasemia litterata Scop. 1901 list (*teste* F. W. Lambert); cf. Nat. Hist. Ox., p. 231. This record requires confirmation; no specimen or other evidence supporting it has been traced.

Pyrausta ostrinalis Hübn. (Regarded by Mr. Meyrick as conspecific with *P. purpuralis* Linn.). Mentioned in Stainton's Manual, II, p. 138, as occurring at Oxford. The record is improbable; Stainton, or his informant, may have intended it to refer to the chalk downs of Oxfordshire or Berkshire, where *ostrinalis* is common.

P. flavalis Schiff. Stainton's Manual, II, p. 149. A still more improbable record than the preceding; possibly the chalk downs were intended.

Scoparia lineola Curt. 1901 list. An error of identification; probably for *S. angustea* Steph.

S. basistrigalis Knaggs. Nat. Hist. Ox., p. 241. An examination of the genitalia proved the specimens in question to be *S. ambigualis* Treits. (*teste* O.W.R.).

S. atomalis Doubl. 1901 list. An error of identification; presumably for *S. ambigualis* Treits., of which *atomalis* appears to be a moorland form.

TORTRICINA.

TORTRICIDAE.

Tortrix rusticana Treits. Recorded as *Clepsis rusticana* in the Berkshire list (*teste* W.G.P.-S.). An error of identification; the specimens are *Capua favillaceana* Hübn.

Cnephasia abrasana Dup. Recorded as *Sciaphila abrasana* in Ent. Mo. Mag., L, 1914, p. 241. The specimens in question, captured at North Hinksey, are a dark unicolorous form of *C. pascuana* Hübn.

C. conspersana Dougl. Recorded as *Sciaphila conspersana* in Ent. Mo. Mag., L, 1914, p. 241. An examination of the genitalia has proved the specimen in question to be *C. chrysanthemana* Dup. (teste O.W.R.).

Peronea variegana Schiff. ab. **albana** Westw. Recorded from Glympton, with the generic name *Acalla*, in Ent. Mo. Mag., LXII, 1926, p. 29. As Mr. W. G. Sheldon has pointed out to me, the form in question is not *albana*, and at present lacks a name.

EUCOSMIDAE.

Polychrosis fuligana Haw. Recorded as *Sericoris fuligana* in the Berkshire list (teste A.S., N.V.S., W.G.P.-S.). Undoubtedly an error for *Endothenia carbonana* Barr. (then incorrectly known as *fuligana* Hübn.).

Endothenia oblongana Haw. Recorded as *Penthina marginana* Haw. in the Ent. Mo. Mag., L, 1914, p. 241. The specimens in question are *E. sellana* Hübn.

E. fuligana Hübn. Ent. Mo. Mag., L, 1914, p. 241 (*Penthina fuligana*), and LVII, 1921, p. 17 (*Olethreutes fuligana*); also Nat. Hist. Ox., p. 236 (do.). The records refer to the *Ajuga*-feeding species, *E. carbonana* Doubl.

TINEINA.

CELECHIADAE.

Bryotropha decrepidella Herr.-Schäff. var. **lutescens** Const. Nat. Hist. Ox., p. 238. The specimens in question are regarded by Mr. Meyrick as a pale form of *Gelechia terrella* Hübn.

Celechia cuneatella Dougl. Berkshire list (teste W.G.P.-S.). An error of identification; specimens standing under this name in the collection of A. Sidgwick are *Chelaria gibbosella* Zell.

G. muscosella Zell. 1901 list and Berkshire list (teste N.V.S.). An error of identification; the specimens in question are *Anacampsis populella* Clerck.

COSMOPTERYGIDAE.

Chrysoclista bimaculella Haw. 1901 list. The specimen on which the record is based has not been traced, and confirmation is necessary.

OECOPHORIDAE.

Depressaria pallorella Zell. 1901 list (*teste* A.S.). An error of identification; the specimens in question are *D. liturella* Schiff.

D. capreolella Zell. 1901 list (*teste* A.S.). An error of identification; the single specimen is probably a small and worn example of *D. applana* Fabr.

ELACHISTIDAE.

Elachista gangabella (Fisch. v. Rösl.) Zell. 1901 list (*teste* N.V.S.). An error of identification; a specimen standing under this name in the collection of A. Sidgwick is *Stomopteryx vorticella* Scop.

E. adscitella Staint. Berkshire list (*teste* A.S.). The specimens in question are *E. megerlella* Staint., with which Mr. Meyrick considers *adscitella* to be conspecific.

E. obliquella (Edl.) Staint. Berkshire list (*teste* N.V.S.). A specimen standing under this name in the Pogson-Smith collection is merely a worn *E. megerlella*. *Obliquella* is in any case a doubtful species.

HYPONOMEUTIDAE.

Hyponomeuta evonymella Linn. Recorded as *H. euonymellus* Linn. in the 1901 list and the Berkshire list. Evidently an error for *H. cognatella* Hübn.

COLEOPHORIDAE.

Coleophora ochrea Haw. Nat. Hist. Tin., V, p. 112; cf. Ent. Mo. Mag., LXIII, 1927, p. 72. Stainton's mention of 'Oxford' as a locality for this species may possibly refer to the chalk downs of Oxfordshire or Berkshire; cf. the remarks made above on *Pyrausta ostrinalis* and *P. flavalis*.

CRACILARIADAE.

Lithocolletis pyrivorella Banks. Ent. Mo. Mag., LXI, 1925, p. 194. The specimens in question are all referred by Mr. Meyrick to *L. concomitella* Banks.

L. amyotella Dup. 1901 list (*teste* A.S.). Undoubtedly an error of identification, although the specimen on which the record was based cannot be traced.

Phyllocnistis sorhageniella Lüders. Recorded as *P. tremulella* Zell. in Ent. Mo. Mag., LXI, 1925, p. 88. An error of identification, based on examples of the summer brood of *P. suffusella* Zell.

TINEIDAE.

Monopis imella Hübn. Recorded as *Tinea imella* in the 1901 list (*teste* A.S.). An error of identification; two speci-

mens under this name in the collection of A. Sidgwick are *M. rusticella* Hübn.

Ochsenheimeria bisontella Zell. Nat. Hist. Ox., p. 237. An error of identification; the specimen is *O. birdella* Curt.

Census of Species

Phylum.	Family.	Species in Britain.	Total.	Species in the Oxford district.	Total.
PYRALIDINA.	PHYCITIDAE	49		18	
	GALLERIDAE	5		3	
	CRAMBIDAE	33		13	
	PYRAUSTIDAE	68		32	
	PYRALIDAE	8		6	
	PTEROPHORIDAE	34		15	
		—	197	—	87
TORTRICINA.	PHALONIADAE	47		26	
	TORTRICIDAE	83		50	
	EUCOSMIDAE	208		129	
		—	338	—	205
TINEINA.	GELECHIDAE	137		65	
	COSMOPTERYGIDAE ...	27		18	
	BLASTOBASIDAE	2		0	
	OLEOPHORIDAE	75		42	
	ORNEODIDAE	1		1	
	AEGERIADAE	15		10	
	HELIOTELIDAE	6		4	
	HELIODINIDAE	6		3	
	GLYPHPTERYGIDAE ..	12		7	
	ELACHISTIDAE	38		28	
	DOUGLASIADAE	1		0	
	SCYTHRIDAE	9		3	
	HYPONOMEUTIDAE ...	54		33	
	COLEOPHORIDAE	82		42	
	GRACILARIADAE	80		59	
	EPERMENIADAE	9		3	
	PLUTELLIDAE	25		15	
	LYONETIADAE	33		21	
	TINEIDAE	50		25	
	LAMPRONIADAE	11		9	
	ADELIDAE	14		10	
		—	687	—	398
NEPTICULINA.	NEPTICULIDAE	77		56	
		—	77	—	56
MICROPTERYGINA.	HEPIALIDAE	5		5	
	MICROPTERYGIDAE ...	14		11	
		—	19	—	16
		—	1318	—	762

The above total of 1,318 British species includes four which have been added since the publication of Mr. Meyrick's Revised Handbook, and eleven which that work does not recognise as being specifically distinct. The total for the Oxford district amounts to nearly 58 per cent. of the whole. In it are included a few species (e.g. *Salebria fusca*, *Gelechia umbrosella*, *Dichomeris marginella*, *Chirocampa lambdella*, *Argyresthia conjugella*, *Lithocolletis sorbi* and *L. strigulatella*) whose presence is probably or certainly due to artificial introduction; but any attempt to draw a clear line of demarcation between indigenous and introduced Micro-lepidoptera would be futile. Two species (*Crambus chrysonuchellus* and *Tortrix paleana*) have only been found a short distance outside the ten-mile radius, and the occurrence within that radius of certain others (*Cnephasia osseana*, *Schiffermuelleria augustella*, *Epigrapha steinkellneriana*, *Lampronia capitella* and *Nepticula dulcella*) requires confirmation. A few undescribed species, known to occur in the Oxford district, but not yet adequately studied, have been omitted from the census.

TINEINA IN THE OXFORD DISTRICT.

BY E. G. R. WATERS, M.A., F.E.S.

(Continued from Vol. LX, p. 103.)

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxi.

VI. GRACILARIIDAE.

Staudinger and Rebel's 'Catalog' (1901), the arrangement and nomenclature of which are here followed, includes in this family the genera *Gracilaria*, *Coriscium*, *Ornix*, *Bedellia*, *Lithocolletis* and *Tischeria*. The Oxford district, with its sheltered woodlands and varied flora, is a particularly favourable one for the study of these delicate insects; of the species which might be expected to occur, very few are missing. Additions to the county list printed in the Victoria County History of Berkshire, Vol. 1 (1906), are indicated by an asterisk. No Oxfordshire list has yet appeared.

GRACILARIA. The commoner species (*alchimiella* Sc., *stigmatella* F., *elongella* L., *tringipennella* Z., *syringella* F. and *auroguttella* Sthph.) are all frequent, some of them abundant, in this district, and I have bred them all from their recognized food-plants. Examples of a dark form of *syringella*, with the white markings almost entirely obliterated, have been taken in Mongewell Woods and at Streatley, on the chalk downs. * *G. semifascia* Hw. has not been noticed in the immediate vicinity of Oxford, but is not uncommon among maple at Streatley; a large proportion of the spe-

cimens have no trace of a fascia. Examples of *G. phasianipennella* Hb. were taken at Cothill, disturbed from mixed herbage, on Oct. 15th, 1922, and Sept. 27th, 1924; both are of the brown form with pale dorsum, other markings being absent or very faint. *G. omissella* Stt. is common in and around Oxford on *Artemisia vulgaris*; I have bred it from larvae found at Cothill and on waste ground in North Oxford, have seen blotches made by the larvae at Shotover and have captured the moths at Boar's Hill. It was a great pleasure to find *G. ononidis* Z., a minute but strikingly beautiful species, in a meadow near Shabbington Wood; several specimens were captured on May 28th and 30th, 1922, and one on June 14th, 1923, all flying in evening sunshine. In all probability the species has now been trampled out of existence in that locality by cattle.

CORISCUM. *C. brongniardellum* F. is abundant in thatch, before and after hibernation, at Tubney and Stanton St. John, and has occurred also at Boar's Hill and in Bagley Wood. **C. cuculipennellum* Hb. is rather common in Tubney and Bagley Woods, on Bladon Heath and in the woods round Stanton St. John. *C. sulphurellum* Hw. is more local; I know of only two specimens found in this district, both taken by myself on Bladon Heath.

ORNIX. *O. anglicella* Stt. and *O. avellanella* Stt. are common everywhere. *O. guttea* Hw. is generally distributed, and is common on apple-trees in Oxford gardens. *O. torquillella* Z. is widely distributed on blackthorn; I have bred it freely from larvae found at South Hinksey and near Shabbington Wood, and have taken the moth in Waterperry Wood. **O. scoticella* Stt. is plentiful in the University Parks at Oxford, the larvae feeding on *Pyrus aucuparia* and *Cotoneaster frigida*, and has occurred on a small mountain-ash tree in my own garden. On the chalk downs, at Streatley, Watlington, etc., it is not uncommon on *Pyrus aria*. *O. betulae* Stt., though not plentiful, is generally distributed on birch in and around Oxford. *O. fagivora* Frey occurs in beech-woods on the Oxfordshire Chilterns and at Streatley; in the Nettlebed district it can be found rather commonly on beech-trunks. I have bred all these species from larvae except *fagivora*. Larvae of a species of *Ornix* inhabit the leaves of *Pyrus torminalis* in Waterperry Wood, but have not yet been reared.

BEDELLIA. Single specimens of **B. somnulentella* Z. were taken by myself in Bagley Wood on Sept. 27th, 1919, and on Mouldsford Downs on Oct. 7th, 1920.

LITHOCOLLETIS. During the last few years I have given much attention to these pretty insects, and have bred many of them in

plenty. The larvae can conveniently be collected in the late autumn, just before the leaves in which they feed fall from the trees; but as they pupate within the leaves, many species can be found throughout the winter, either in fallen leaves (*e.g.* of crab-apple, wild cherry, hazel, sycamore) or in leaves which cling to the trees in sheltered spots or close to the trunks (*e.g.* of oak, beech, hornbeam). The task of searching for *Lithocolletis* blotches among fallen leaves requires a certain amount of patience, but can be made remunerative if one is careful to note likely trees earlier in the season. Like the Nepticulids, the Lithocolletids can be induced to emerge during the winter months, if kept in a warm room; in fact they can be regulated (more easily than the Nepticulids) in such a manner as to produce moths in a steady stream. I find it best to keep most of the tenanted leaves out of doors until after Christmas; a tin at a time can then be brought into a warm room, and the moths usually begin to emerge within about three weeks. Larvae collected in July and August will sometimes produce a partial second brood of moths in August and early September, while other individuals remain in the pupae and emerge (indoors) in the course of the winter; I have noticed this in the case of *sorbi* and *quinqueguttella*, and it is doubtless the same with others.

Little attention has hitherto been paid to the Lithocolletids in the Oxford district. Nine species only were mentioned (one, *amyotella*, certainly in error) in the Oxford list published in 1902, and the Berkshire county list added hardly any new local records. I therefore give a complete list of the species found here, grouped according to their food-plants.

Oak. Of the species whose larvae live in oak leaves, six occur in this district. *L. quercifoliella* Z. is excessively abundant, and *L. cramerella* F. very common. On May 3rd, 1924, I bred a beautiful aberration of *cramerella* from Cothill, having no dark markings except a fine fuscous line from the base of the forewings to the middle of the costa, and a dark hook in the apical and terminal cilia. The other species are more local. *L. hortella* F. is found plentifully in the Tubney district, and I have taken specimens at South Hinksey. **L. roboris* Z. has hitherto occurred only in a single secluded spot in Bagley Wood, where it is by no means plentiful. Neither of these species has yet been noticed on the Oxfordshire side of the Thames. **L. heegeriella* Z., on the other hand, is locally common in Waterperry Wood and near Shabbington Wood, but I have only once found a specimen on the Berk-

shire side—in Bagley Wood on May 25th, 1922. *L. lautella* Z. occurs sparingly in Waterperry Wood and near Shabbington Wood, and I have taken it at Stoke Row on the Oxfordshire Chilterns. A beginner is apt to find the abundance of *Lithocolletis* blotches on oak quite embarrassing, and to have difficulty in distinguishing those of the better species; but with a little experience they can usually be distinguished at a glance. Thus the larva of *lautella* makes a long, narrow blotch from the midrib outwards, drawing the two edges of the blotch together until they almost meet, and is readily separated from *quercifoliella*, which makes a broad oval blotch with a conspicuous longitudinal ridge. The blotches of *cramerella*, *hortella* and *heegeriella*, all situated normally on the edge of the leaf, cannot always be separated with certainty. That of *heegeriella*, however, can usually be distinguished by its small size, being often completely hidden by the down-turned tip of a lobe of the leaf; while that of *hortella* often has the leaf-edge folded across it diagonally in a characteristic manner. By combining such points with one's knowledge of the localities, it is possible to breed the various species almost unmixed. The blotch of *roboris*, of which I have bred only one specimen, is already well known.†

Evergreen oak, etc. *L. messaniella* Z. abounds on *Quercus ilex* in Oxford streets and gardens, some trees having larvae or empty blotches in almost every leaf. In Bagley Wood the larvae are not uncommon on some small planted trees of *Quercus Turneri*. They are frequent also in leaves of Spanish chestnut (at Shotover, in Tubney Wood and in Wytham Woods) and on hornbeam (at Oxford and Wytham). There is an abundant third brood of the moth in October and November, the larvae from which may be found on evergreen oaks from December onwards. It would be interesting to know what becomes of those colonies which frequent deciduous trees such as hornbeam and Spanish chestnut—do they die off or migrate to evergreens and return next season? In favour of the latter alternative it may be mentioned that at Oxford I find this species commonly on hornbeams which face some *Quercus ilex* on the opposite side of the road, whereas other hornbeams a little way off are untouched.

Alder. This tree is local about Oxford, but grows freely in Bagley Wood and at Cothill, and in both of these localities all the British alder-feeding *Lithocolletis* occur. *L. alniella* Z. is plentiful, *L. froelichiella* Z. is sometimes common at Cothill, *L. kle-*

† Cf. Dr. Wood in Ent. Mo. Mag., 1886, p. 261.

mannella F. and *L. stettinensis* Nic. occur more sparingly. The three latter are surely the most showy species of a very ornamental genus. The larva of *stettinensis* is fortunately easy to find, its blotch (oval, with a strong longitudinal central ridge) being placed conspicuously on the upper side of the leaf. The other larvae live on the under side, and are not so easily separated; but the blotch of *froelichiella*, lying between two nervures of the leaf, with the midrib as base, can be distinguished as a rule by its length and narrowness.

Hazel. **L. coryli* Nic. and *L. nicellii* Stt. are both common on hazel, the former making its blotch on the upper, the latter on the under side of the leaf.

Hornbeam. **L. carpinicolella* Stt. is not uncommon on hornbeam in Wytham Woods and in the University Parks at Oxford; its white blotch, on the upper side of the leaf, is readily detected. *L. tenella* Z. has not yet been noticed in this district; blotches found on the under side of hornbeam leaves have produced *mesaniella* only.

Beech. *L. faginella* Z. is very common.

Birch. *L. ulmifoliella* Hb., the only species yet found in this district on birch, is common.

Sallow and willow. *L. salicicolella* Sirc. is common everywhere on sallow. *L. spinolella* Dup. is somewhat more local, but occurs, often abundantly, in all the woodlands among sallow. It is common on the Oxfordshire Chilterns among *Salix caprea*, which grows freely in the more open beech-woods. Blotches found at Tubney in leaves of *Salix cinerea* have produced a number of remarkable examples of *spinolella*, with the ground-colour a brighter golden and the basal streak longer and clearer than usual, and with the white fascia bent or even sharply angulated; the most extreme of these cannot be separated from *L. cavella* Z., but so far as I know this species has never been found on anything but birch. *L. viminiella* Stt. is common; I have bred it in plenty from *Salix cinerea*, *S. triandra*, *S. fragilis* and *S. viminalis*, and from a dark-leaved species of *Salix* planted in the University Parks. At Tubney the moth frequents thatch. From leaves of *Salix viminalis* collected in November, 1923, at Marston there emerged first several scores of *viminiella*, and then ten examples of *L. viminetorum* Stt.

Poplar. *L. comparella* Z. has been bred freely from blotches found by Mr. A. H. Hamm near Ifley, and by myself at Cothill and Hinksey Hill, in each case on grey poplar (*Populus canescens*). A *Lithocolletis* blotch, with empty pupa-case projecting beneath,

which I found on Sept. 17th, 1923, on a smooth-leaved poplar in the University Parks, may possibly have been this species. *Com-
parella* appears to have a third brood of imagines very late in the year; leaves gathered in the autumn and kept out of doors produce moths from mid-October to December. Do these moths in nature hibernate, or do they deposit their eggs forthwith on the buds or twigs?

Elm. Larvae of *L. schreberella* F. are common on elm, though the moth is not often met with. *L. tristrigella* Hw. is more local, but occurs commonly on fences at Oxford and in elm-hedges at Cothill, and specimens have been bred from elm-leaves collected at Shotover.

Maple and sycamore. *L. sylvella* Hw. is not so common as might be expected, seeing that maple grows in almost every hedge-row; but moths or larvae have been found in many spots round Oxford, including Bagley and Wytham Woods, Cothill, Wychwood, Shotover and Watlington. The occurrence in this district of **L. geniculella* Rag., the sycamore-feeding species allied to *sylvella*, is specially noteworthy, as it has not hitherto (to my knowledge) been recorded as British. On several occasions I had noticed, in the Tubney district, empty blotches of a *Lithocolletis* on the underside of leaves of sycamore (*Acer pseudoplatanus*), and had supposed them to be merely stray examples of *sylvella* or some other common species. In the winter of 1924-5 I gave the matter closer attention, and was fortunate enough to find a small group of sycamores at Tubney where the blotches were fairly common. Repeated searches among fallen leaves enabled me to accumulate well over a hundred blotches, from which I bred a large number of ichneumons and about three dozen imagines of *geniculella*. All, without exception, have the first fascia acutely angulated and connected at its apex with the second fascia (whereas in *sylvella* the first fascia is obtusely angulated or nearly straight, seldom produced towards the second), and agree in all other respects with *geniculella* as described and figured by Ragonot.* The blotch resembles that of *sylvella*, but is usually placed well away from the edge of the leaf, often near the base between two of the main nervures, whereas that of *sylvella* is almost always on the edge.† Although nearly all my specimens come from one group of trees, the insect certainly has a wider distribution, as I have found a few

* Annales de la Société Entomologique de France, 1874, p. 601; figure in the same periodical, 1876, plate 6, figure 8. In the 1874 number a specimen of *sylvella* was erroneously figured as *geniculella*.

† I have counted 36 blotches of *geniculella* on the edge of the leaf, 112 away from the edge.

blotches in other parts of the wood (including some of the summer brood on July 13th, 1925), and others at Cothill a mile away.* On the Continent *geniculella* is found in Germany, Bohemia, Hungary, Austria, France and Belgium. It has also been referred to under the names *acernella* and *acerifoliella*, and Ragonot's *pseudoplataniella* appears to be merely a variety; but the synonymy of this little group is a tangle that will need careful unravelling.

Apple and pear. I have given much attention to the puzzling group of species allied to *concomitella*, dealt with by Mr. E. R. Banks in this magazine, vol. 35, 1899, pp. 241 and 284, and in the early months of 1924 bred large numbers of the apple-feeding species. *L. concomitella* Bnks., **L. pyrivorella* Bnks. and **L. blancardella* F. are all widely distributed in this district on crab-apple, and occur on apple-trees in my own garden. Larvae collected in any locality usually produce all three species, though in varying proportions. *Blancardella* is readily distinguished by its vivid and unmixed coppery-golden ground-colour, contrasting finely with the clear white markings; it emerged in large numbers from leaves collected on the edge of Shabbington Wood, other localities being Oxford, Shotover and Bagley Wood. *Pyrivorella* and *concomitella* are easy enough to separate in their typical forms, but when bred indiscriminately there remain a certain number of doubtful specimens and it is difficult to draw a clear dividing-line between the two. Mr. J. Hartley Durrant first drew my attention to the occurrence of *pyrivorella* in this district by identifying specimens among some Lithocolletids which I submitted to him, and has since kindly confirmed my identification of a number of more doubtful examples. Localities for *pyrivorella* are Oxford, Shotover (where it predominates), Waterperry Wood, Shabbington Wood, South Hinksey and Bagley Wood; and for *concomitella*, Shotover, Shabbington Wood, South Hinksey, Bagley Wood, Hen Wood and Cothill. An empty blotch which I found in Bagley Wood in a leaf of wild pear (under side) may well have been *pyrivorella*.

Mountain-Ash. Larvae of *L. sorbi* Frey occur on some mountain-ash trees (probably planted) at Shotover; presumably the moth was introduced with the trees. Mr. Banks mentioned as a distinctive feature of *sorbi* that the moth always emerges through the upper cuticle of the leaf, but in my experience this is too sweeping a statement. I bred a large number of *sorbi* in August, 1924, from blotches found on *Pyrus aucuparia* in North Wales; the majority

* On July 21st, 1925, after this paper was written. I found larvae commonly on a sycamore in Bagley Wood. In a few cases the moth had already emerged.

certainly emerged on the upper side of the leaf, but a considerable minority chose the under side. From a *Lithocolletis* blotch found on *Pyrus aucuparia* in the University Parks, there emerged on Jan. 29th, 1924, a beautiful and unmistakable example of *L. mespilella* Hb. The service-tree (*Pyrus torminalis*) occurs in some of the woods in this district, and the whitebeam (*P. aria*) is abundant on the chalk downs, but I have not succeeded in finding *mespilella* on them.

Hawthorn, etc. *L. oxyacanthae* Frey is very common. *L. corylifoliella* Hw. is common on hawthorn, but has a range of food-plants much wider than is usual in this genus; I have bred specimens also from blotches found in this district in leaves (upper side) of crab-apple, garden apple, pear, *Prunus cerasus*, *Pyrus aucuparia*, *P. aria* and *P. torminalis*, and have found a blotch in a leaf of *Cotoneaster frigida* in the University Parks.

Blackthorn and wild cherry. *L. spinicolella* Z. is common on blackthorn. Larvae of **L. cerasicolella* Hb. are locally common on wild cherry (*Prunus cerasus*) at Shotover and in Wytham Woods, and I have taken the moth in Bagley Wood.

Viburnum. **L. lantanella* Schrk. occurs on *Viburnum lantana* in Bagley and Tubney Woods, but rather irregularly. In the autumn of 1924 larvae were abundant at Cothill, where I found one also in a leaf of guelder-rose (*V. opulus*). Specimens of the moth have been taken among *V. lantana* on the chalk downs at Streatley and Pangbourne.

Honeysuckle. *L. trifasciella* Hw. is general on honeysuckle; beginning to feed in March, it manages to get through three broods in the season. **L. emberizaepennella* Bouché was formerly recorded as an Oxford insect by Stainton,* but I have taken only a single specimen here—at Boar's Hill, on May 25th, 1915.

Ulex. *L. ulicicolella* Stt. was found commonly on June 20th and 21st, 1924, among gorse bushes in Tubney Wood and on Cumnor Hurst.

With the exception of the last two, all of these species have been bred by myself from larvae or pupae found in leaves. Two or three others may be expected to turn up in time, but the present aggregate of thirty-eight species for the district can be regarded as satisfactory.

TISCHERIA. Out of five species recorded as British, four occur here. *T. complanella* Hb. and *T. dodonaea* Stt. are about equally

* Nat. Hist. of the Tineina, vol. 2, p. 124.

common in most of the oak-woods; their larvae, making white and brown blotches respectively, are easily detected. *T. marginea* Hw. is common on bramble, and at Cothill the larvae feed also in leaves of wild raspberry. *T. angusticolella* Dup., a more local insect, occurs rather commonly in Waterperry Wood and near Shabbington Wood; the perfect insect is not often found, but by collecting the larvae in leaves of wild rose very late in the season (Oct.—Nov.) one can breed the moth in plenty.

40 Leckford Road, Oxford.

July 19th, 1925.

TINEINA IN THE OXFORD DISTRICT.

BY E. G. R. WATERS, M.A., F.E.S.

(Continued from Vol. LXI, p. 196.)

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxxiii.

VII. COLEOPHORINAE.

Notes on the Elachistidae of the Oxford district were published in this Magazine in 1923¹; but the Coleophorinae, on account of their number and obscurity, were reserved for separate treatment. Thanks to the remarkable habits of the larvae, the Coleophorids form one of the most fascinating groups of British Lepidoptera, but at the same time they are one of the most difficult. The need of an up-to-date monograph on the sub-family in general, or on the British species in particular, is keenly felt, although Stainton's two volumes² are still useful, and various scattered papers by other authors³ may be consulted with profit. No real progress can be made in the study of these insects until one has found them in their early stages and reared each species; and even in a restricted district several seasons' work is necessary before one can identify the

¹ Vol. LIX, p. 225. This paper now requires a large supplement.

² *The Natural History of the Tineina*, vols. iv (1859) and v (1860).

³ Notably Dr. J. H. Wood's articles on the British rush-feeding Coleophorids in *Ent. Mo. Mag.*, xxviii (1892), and Mr. A. Sich's Observations on the Family Coleophorids in *Ent. Record*, xxxiii, xxxiv and xxxv.

principal species that occur and connect them with their respective larvae. The Oxford district does not, when first worked, appear to be specially favourable for the study of the Coleophorinae, several species reputed common being remarkably scarce and difficult to obtain, and other likely species not (so far as is known) occurring at all; but a sufficient number of interesting discoveries has now been made to compensate for the deficiencies.

Compared with the Nepticulids, Lithocolletids, Elachistids and many other small Lepidoptera, the Coleophorids are decidedly difficult to rear. To keep the larvae indoors, or in tins, or on cut leaves, is to court failure. Even those larvae which complete their feeding in the autumn (e.g. *C. paripennella* Z., *C. potentillae* Elisha, *C. orbitella* Z., *C. therinella* Tgstr., *C. argentula* Z., *C. antennariella* HS. and *C. adjunctella* Hodgk.) remain till spring in the vulnerable larval stage, and usually die if not exposed to the open air and to all weathers. They cannot with safety be encouraged by means of artificial warmth to pupate and produce moths during the early months of the year; though I have bred *paripennella* as early as April 21st (1923), after keeping the larvae indoors all the winter. Those larvae which complete their feeding in the spring after hibernation can be collected in spring and sometimes reared successfully in glass-topped tins indoors; but the species which construct large cases of leaf-fragments (e.g. *C. gryphipennella* Bch., *C. fuscadinella* Z., *C. bicolorella* Stt. and *C. genistae* Stt.) have a most tiresome habit of walking along one another's silken threads and collecting in a tangled bunch on the side nearest the light, where they either get parted from their cases or starve to death. In all cases it is preferable to place the larvae out of doors on growing plants, e.g. in a large flower-pot standing in a bowl of water, the plant being entirely surrounded by gauze (I use a cylinder of metal gauze with a muslin cap). Even when all precautions are taken, a batch of larvae will often prove to be mostly or entirely ichneumoned, or mites will nibble their way into the cases made of softer material. Larvae of the rush-feeding species need not be placed on growing plants; it is sufficient to cut off the rush-stems and insert them in damp earth. Each species of larva ought to be isolated if possible, or at least only those species should be put together which there is no possibility of confusing; otherwise one may be unable to refer a moth with certainty to its larva, and another season or more must then pass before one's conclusions can be confirmed.

A feature in the life-history of many Coleophorids is the great irregularity of their time of appearance. The dates mentioned in

the handbooks are to be regarded as approximate or normal only; little surprise need ever be felt on finding a *Coleophorida* larva or moth at an unexpected time. The following are specific instances. In the near neighbourhood of Oxford *C. albitarsella* Z. emerges regularly in June; but on a sunny chalky hill-side at Streatley, some twenty miles away, I found the moth common and in good condition on August 5th, 1922. Larvae of *C. paripennella* Z. are to be found ordinarily from July to October; but on January 4th, 1924, just after a spell of mild weather, I found numerous fresh blotches on some brambles near Thursley (S.W. Surrey), and discovered a larva by searching down a stem. Larvae of *C. solitariella* Z. usually become full-fed at the end of May and produce moths in June; but at Thursley on July 13th, 1923, I found two fully-grown larvae, one of which remained alive until the following spring, and then produced an ichneumon. These were probably survivors of the hibernated spring larvae, as the plants on which they were found were extensively blotched. In a similar manner full-fed larvae of *C. discordella* Z. were found on the North Devon coast on July 13th, 1924, and of *C. alcyonipennella* Koll. at Symond's Yat on the Wye on July 10th, 1926. Larvae and moths of *discordella* may in fact often be found together in the same locality; I have seen the larvae at all dates from early April to October, the moths from early June till the end of August, and these dates could undoubtedly be extended. From a batch of cases of *C. genistae* Stt. obtained at Silchester on May 23rd, 1925, moths emerged in a long succession from June 6th to July 26th, and a single example on September 2nd. *C. ochrea* Hw., which is stated to appear in the perfect state in July, was not uncommon in an Isle of Wight locality on August 30th, 1926. Larvae of *C. alticolella* Z. are often full-fed in September; but in Waterperry Wood on December 17th, 1922, I picked some seed-heads of *Juncus articulatus*, on which there appeared a few days later several larvae still in their immature cases.⁴ The larva of *C. limosipennella* Dup. is well known for the uncertainty of its time of feeding; while *C. bicolorella* Stt. may be found on the wing from midsummer to mid-September. These irregularities cannot be explained by the supposition of double broods. No *Coleophora* (so far as my knowledge goes) has more than one brood in a season; some species (e.g. *C. inulae* Hein.-Wck. and *C. sylvaticella* Wood) even have a two-year life-cycle. Again, no rule can be laid down as to the stage at which those larvae hibernate which feed again after hibernation. My experience with *C. gryphipennella* Bch., *C. viminetella* Z., *C. limosipennella*

⁴ i.e. composed of the seed-capsule only, without any visible silk.

Dup. and others shows that they hibernate in cases varying greatly in size ; it is therefore misleading to speak of the smaller cases as pre-winter, the larger as post-winter cases.

The list of Lepidoptera of the Oxford district, published in 1902 by the Ashmolean Natural History Society, mentions only six of the commonest species of *Coleophora*, and the Berkshire list, which appeared in 1906 in Vol. I of the Victoria History of the county, added hardly any new records from the northern area. As this group of insects has been so little studied, it seems desirable to give a complete list of the species met with in the district. The future monographer of the Coleophorids may also find it useful if mention is made of all the food-plants on which each has been found ; the information available on this point is inadequate and often unreliable, and the deficiency can only be made good if observers will make a point of recording their experiences. In the absence of any definitive subdivision of the genus, it is perhaps permissible to arrange the species according to their food-plants, thus grouping together those which are found together in nature. Coleophorid larvae, however, are seldom restricted to a single species of plant, and often have a considerable range of foods, though confining themselves as a rule to one natural order. It must of course be remembered that the larvae are frequently found on plants on which they do not actually feed (though they often nibble), either being carried away by wind or some other agency from their proper food-plant, or leaving it voluntarily for the purpose of pupation ; isolated records of exceptional food-plants therefore have little value. The nomenclature adopted is that of Staudinger and Rebel's *Catalog*, 1901 edition.⁵ An asterisk indicates that the species is an addition to the Berkshire county list ; no Oxfordshire list has appeared. Some repetition may be avoided by stating at the outset that Bagley Wood, Boar's Hill, Cherbury Camp, Cothill, Cumnor, the Hinkseys, Kennington, Streatley, Tubney and Wytham Woods are in Berkshire ; Radnage and Shabbington Wood in Buckinghamshire ; and the remainder of the localities mentioned in Oxfordshire. .

CISTACEAE. The large and handsome *C. ochrea* Hw., which lives on *Helianthemum vulgare* growing in dry, rocky places, was recorded from Oxford by Stainton,⁶ but has not been rediscovered here in recent times. At the present day there are few spots in the vicinity of Oxford where this species is at all likely to occur.

⁵ Except in the case of *ibipennella*.

⁶ *Nat. Hist. Tin.*, v, p. 112.

CARYOPHYLLACEAE. The species which feed on *Stellaria holostea* seem surprisingly scarce in the immediate neighbourhood of Oxford. *C. solitariella* Z. has been bred from larvae found at Tubney, and blotches probably due to this species have been noticed at Shotover. *Asychna modestella* Dup., which belongs to this sub-family, has been taken by Mr. O. W. Richards at Shotover and by myself in Bagley Wood. Both these insects are, however, common along roadsides on the Oxfordshire Chilterns, e.g. at Stoke Row and Hailey. *C. apicella* Stt., which is attached to *Stellaria graminea*, has been taken very sparingly at South Hinksey, at Cothill and on the outskirts of Shabbington Wood.

LEGUMINOSAE. *C. albicosta* Hw. occurs commonly among gorse in Tubney Wood and in the Cumnor and Boar's Hill district, while Mr. Richards has taken it at Shotover. The absence from the Oxford district of the species attached to *Cytisus* and *Genista tinctoria* is disappointing, while *Genista anglica* hardly occurs. *C. discordella* Z. is rare in the vicinity of Oxford, being represented by a single example captured at South Hinksey; it is common enough, however, on the chalk downs, e.g. at Watlington, Highmore and Streatley, where the larvae are sometimes rather plentiful on *Lotus corniculatus*. *C. spissicornis* Hw. is widely distributed in dry and ungrazed grassy places, having been taken at Oxford, Holton Pits, Highmore, Kennington and Cherbury Camp. A few examples of *C. deauratella* Z. have been captured at Holton Pits and near Shabbington Wood, and Mr. N. V. Sidgwick formerly recorded this species from Boar's Hill. One specimen of **C. frischella* L., in freshly-emerged condition, was taken among *Melilotus officinalis* at Kennington on July 8th, 1925; attempts to find the larvae in the autumn were unsuccessful.

ROSACEAE. The only species hitherto found here on rose is *C. gryphipennella* Bch., which is common on *Rosa canina*, *R. arvensis* and garden roses. *C. nigricella* Stph. is common, feeding indiscriminately on apple (wild and in gardens), hawthorn, *Prunus spinosa* and *P. insititia*; the larva has also been found on *Prunus cerasus* (at Shotover), and once on *Cotoneaster frigida* in the University Parks. Another polyphagous species is *C. anatipennella* Hb., the larvae of which are widely distributed on *Prunus spinosa*, *P. insititia*, hawthorn and crab-apple; their presence is most easily detected in the autumn, when each leaf attacked is conspicuously speckled with tiny white blotches. The moth has been taken at Yarnton and Boar's Hill, larvae at South Hinksey, Kennington and near Shabbington Wood. But the species with the widest

range of food-plants are *C. paripennella* Z. and *C. potentillae* Elisha. The former has been found at Shotover on crab-apple, and near Shabbington Wood on crab-apple, hawthorn and *Prunus spinosa*.⁷ *Potentillae* is locally plentiful in the area between Forest Hill and Shabbington Wood. On October 9th, 1924, in the course of about an hour and along a line of about a hundred yards, I found the larvae feeding on no less than seven different plants, viz. *Potentilla tormentilla*, *Spiraea ulmaria*, *Rubus 'fruticosus'*, *Prunus spinosa*, *Corylus*, *Agrimonia* and *Rubus caesius*, the most favoured being the last two. In Waterperry Wood the larvae are almost confined to *Potentilla tormentilla*. Bred specimens of the moth vary in colour from grey to bronze. One other species, the larva of which inhabits a very flat brown case of leaf-fragments (like that made by *limosipennella* on elm, but truncated and proportionately broader) has been detected on *Prunus spinosa*, but has yet to be reared and identified.

COMPOSITAE. *C. troglodytella* Dup. has been captured at South Hinksey, Boar's Hill and Tubney. At Cothill the larvae are fairly common on *Eupatorium cannabinum*; they have not hitherto been noticed in this district on the other food-plants (*Pulicaria dysenterica* and *Conyza squarrosa*) which this species favours. Larvae of *C. therinella* Tgstr. were found commonly on *Carduus arvensis* in September and October, 1925, at Kennington and Forest Hill, a few also at Tubney.⁸ The larval case varies in colour from greyish-white to black. The moth has been captured at Highmore on the Chilterns, in Wytham Woods and near Shabbington Wood, and I have found the case on a fence at Boar's Hill. *Therinella* may therefore be accounted one of our commoner species. *C. argentula* Z., on the other hand, though considered a common insect, is remarkably scarce in this district. It is not uncommon in a pit near Cumnor, where the larvae may be obtained during the winter months on seed-heads of *Achillea millefolium*, and I have found a single case at Tubney; but these are the only localities known. I find this species particularly difficult to breed, owing to the fact that mites are able to penetrate the rather flimsy cases and destroy the larvae. *C. alcyonipennella* Koll. is equally scarce, the only known locality within seven miles of Oxford being near Shabbington Wood, where the larvae feed on *Centaurea nigra*. The few examples of the moth which have been captured in that spot were

⁷ Also on elm, birch and hazel—see below. In North Wales birch is the favourite food of this species. In S.W. Surrey I have found a larva on the stem of a small alder, but not actually feeding; also one on bramble, which it had been eating freely.

⁸ None of these larvae would touch food again in the spring; but moths (and a large number of ichneumons) emerged in due course in June.

all taken remarkably early in the summer—on May 15th, 1921, and May 30th, 1922. Farther afield the larvae have been found in fair numbers on *Centaurea scabiosa* growing on Grim's Dyke, near Crowmarsh Gifford (Oxon).⁹

ERICACEAE. *C. juncicolella* Stt. is fairly common on patches of *Calluna vulgaris* at Bladon Heath and Boar's Hill. A single example of the moth was captured on the chalk at Streatley on June 7th, 1924; its presence there is difficult to account for.

LABIATAE. *C. lineolea* Hw. is common. The larvae are often plentiful on *Ballota nigra* and *Stachys sylvatica* growing on waste ground on the outskirts of Oxford. Mr. A. H. Hamm once found a larva feeding on *Lamium album*. In Bagley Wood the larvae feed on *Stachys sylvatica* and in Waterperry Wood on *S. betonica*, sometimes in good numbers. The moth has been taken also at Yarnton and Boar's Hill. **C. niveicostella* Z. occurs on the chalk at Radnage, Watlington, Ipsden and Streatley, the larva being found on thyme in May. It cannot be recorded with certainty from the near neighbourhood of Oxford. A specimen of *C. lixella* Z., which is attached to thyme in its earlier stages, was captured at Holton Pits by Mr. O. W. Richards on June 22nd, 1924, and the following spring I found a larva (in its later stage) feeding on *Briza media* in the same spot. On the Chilterns it has occurred at Chinnor. *C. albitarsella* Z. is widely distributed in the Oxford district, having been found at North and South Hinksey, Boar's Hill and Forest Hill, also on the chalk at Watlington and Streatley. The larvae feed in autumn and spring on *Nepeta glechoma*, *Calamintha clinopodium* and *Origanum vulgare*.¹⁰

⁹ At Symond's Yat (Monmouth) larvae of *alcyonipennella* were obtained on July 10th, 1926, from *Serratula tinctoria*, and one moth was bred on Aug. 2nd. A little earlier large numbers could have been secured, as the plants were riddled with blotches.

¹⁰ A remarkable instance of cross-pairing deserves to be chronicled. In 1924 I had put larvae of *albitarsella*, *discordella* and *niveicostella*, with their respective food-plants, in one large covered flower-pot. Returning home on July 14th after ten days' absence, I found that many moths had emerged, and that a male *niveicostella* (the only example of this species) was paired with a female *albitarsella*. Although left for a day or two, they were unable to separate, and I was ultimately obliged to preserve them as they were. A cross-pairing between two closely-allied species like *niveicostella* and *discordella* would not have been surprising, but *niveicostella* and *albitarsella* belong to quite different sections of the genus.

(To be concluded.)

TINEINA IN THE OXFORD DISTRICT.

BY E. G. R. WATERS, M.A., F.E.S.

(Concluded from p. 75.)

CHENOPODIACEAE. *C. laripennella* Zett. is rather common on waste ground at Oxford, the larva being found on *Chenopodium album*. It has also been taken in many places on the Berkshire side of the river (Boar's Hill, Cothill, Tubney, Streatley, etc.).

ULMACEAE. *C. fuscedinella* Z. is everywhere exceedingly plentiful on elm. Larvae of *C. limosipennella* Dup. have been found on elm on the outskirts of Shabbington Wood, feeding on the twigs growing low down on the trunks; but this species is more general in the district on birch. Larvae of *C. badiipennella* Dup. have been found on elm in Bagley Wood, but elm is certainly not their only food. During rough weather just after midsummer the moths are frequent on fences beneath elms at Oxford, but must be picked out from among swarms of *fuscedinella*. Odd specimens have also been captured at Kennington, Headington and on the chalk downs at Watlington. Larvae of *C. paripennella* Z. have been found on elm at Shotover and near Shabbington Wood.

AMENTACEAE. *C. fuscedinella* Z. occurs commonly on birch, alder and hazel, though never so plentifully as on elm. *C. bicolor-ella* is locally common on alder at Cothill and on hazel in Bagley Wood; in the summer and autumn of 1926 larvae were found also on birch at Cothill. On completing their feeding (mid-June or later) the larvae usually attach themselves to the stem at the base of a leaf, and pupate there; they look almost exactly like a stipule, their reddish colouring being at that stage exceedingly protective. The entomologist, however, will find them with ease, the blotched leaves indicating where a search should be made. Dr. M. Hering has lately attempted¹¹ to give the hazel-feeders specific rank, under the name of *C. politella* Scott, on the ground of a slight difference in the shape of the penis-sheath; but Mr. O. W. Richards, who has examined the genitalia of a number of specimens (♂ and ♀) bred from both alder and hazel, informs me that he finds no constant difference between them, merely the normal individual variations. *Bicolor-ella* is one of the latest of the woodland Coleophorids on the wing; although I have bred it in the open as early as June 23rd, the moth may frequently be captured in August, and even as late as September 15th.¹² Larvae of *C. limosipennella* Dup. are fre-

¹¹ In *Zeitschrift für wissenschaftliche Insektenbiologie*, xx (1925), p. 126.

¹² At Milford (Surrey) in 1925.

quent on birch at Cothill and in Tubney and Waterperry Woods. They are most irregular as regards their time of feeding, being found from midsummer onwards till the end of October; some of those that I collected in the autumn of 1924 spent the winter in their small cases and fed up the following spring. The perfect insect is rarely seen in the open, but I captured a specimen resting on a birch-leaf at Cothill on July 2nd, 1926. *C. orbitella* Z. is generally distributed, almost common, in this district on birch. The larvae have been found in Bagley, Wytham and Waterperry Woods, and more plentifully at Cothill, Boar's Hill and in the University Parks. They have not hitherto been noticed here on alder. A single larva probably of *C. siccifolia* Stt., in a case with a large appendage of leaf, was found on birch at Cothill on September 16th, 1924; unfortunately no moth was bred from it. *C. ibipennella* Stt. (nec Z.) has so far been scarce, but a few larvae or empty cases have been found on birch in the University Parks, at Boar's Hill and at Cothill. *C. paripennella* Z. is yet another birch-feeder, having been obtained from that tree in Waterperry Wood. Of the oak-feeding species, *C. lutipennella* Z. is of course abundant, while *C. palliatella* Zk. is frequent in the principal woods. *C. ardeapennella* Scott has been captured in Bagley Wood (July 22nd, 1920), where an old case has also been found; but the moth has not yet been bred. The occurrence of *C. paripennella* Z. and *C. potentillae* Stt. on hazel has already been mentioned. Larvae of *C. fuscocuprella* HS., for which search had been made in vain several years in succession, were ultimately found in September and October, 1926, fairly common on some low hazel bushes in Tubney Wood.

SALICACEAE. The common *Salix*-feeding species is *C. viminetella* Z., which is generally distributed in this district, the larvae feeding on *Salix caprea*, *S. cinerea*, *S. fragilis*, *S. triandra* and probably *S. viminalis*. It is particularly common on *Salix caprea* growing in the beech-woods on the Oxfordshire Chilterns. At Kennington the larvae frequent stumps of *Salix fragilis* which have sprouted at the top after being planted as field-posts. A small larva of this species, which I obtained at Cothill in the autumn of 1924 and placed by mistake among birch-feeders (it had perhaps strayed from willow on to birch), fed freely and grew to full size on birch the following spring. Cases of *C. albidella* H.-S. have been found on willow (*Salix caprea*, I believe) in Waterperry Wood and at Cothill. This species is tacitly included under *anatipennella* in the manuals of British Lepidoptera; but the larval case is plumper, differently constructed, of a dull black without gloss, and

with a coating of whitish wool on the sides. Stainton¹³ confessed his inability to justify the separation of *albidella* from *anatipennella*, but Sorhagen¹⁴ put forward a strong argument (based on differences in the larval markings as well as in the case) for their distinctness. When more larvae have been obtained, and good series bred from both sallow and blackthorn, there will probably be no difficulty in testing the validity of this 'split.'

CONIFERAE. *C. laricella* Hb. is a pest on larch in Bagley and Tubney Woods, at Chinnor, Streatley and probably in many other localities.

JUNCACEAE. *C. caespititiella* Z. is excessively abundant in every kind of locality on *Juncus communis* (i.e. *effusus* and *conglomeratus*), and larvae are common also on *J. articulatus* (sensu lato). The cases of larvae found on the latter plant near Shabbington Wood are for the most part fuscous or grey instead of ochreous, and might be mistaken for those of *C. agrammella*, but for the fact that granulations are absent or irregular; the moths that emerge from them are in all respects (including genitalia) typical *caespititiella*. The dark form of imago which abounds on moors (e.g. in S.W. Surrey) on *Juncus squarrosus* does not occur round Oxford. **C. glaucicolella* Wood is usually confused with *caespititiella*, and certainly overlaps with it as regards time of appearance; but probably most of the specimens seen in July and August are this species. Mr. O. W. Richards has kindly examined the genitalia of specimens from various parts of the district, with the result that *glaucicolella* can be recorded with certainty from Oxford, Cothill, Cowley Bog and Shotover. The larvae which abound in river-meadows on *Juncus inflexus* (*glaucus*) are probably for the most part (if not entirely) this species; sometimes (e.g. near Forest Hill, December 12th, 1926) they stray on to *Juncus articulatus* growing in the same spot. The floods to which the meadows (e.g. by the railway at Kennington) are periodically subjected, lasting sometimes (as in the early months of 1926) for weeks, do not seem to affect the numbers of the larvae. **C. agrammella* Wood, till recently known only from Herefordshire, where it was discovered by Dr. J. H. Wood, is widely distributed round Oxford. In the autumn of 1924 I found its granulated blackish-grey cases common in a wood near Stanton St. John, and bred a large number of moths the following summer. The larvae occurred in equal numbers on *Juncus effusus* and *J.*

¹³ *Nat. Hist. Tin.*, IV, p. 170.

¹⁴ In *Illustrierte Zeitschrift für Entomologie*, v (1900), p. 113.

conglomeratus, though not of course so plentiful as *caespititiella*. They show a peculiar fondness for eating the pith of their food-plant, whenever the cutting or breaking of stems makes it accessible. I have specimens of the moth, some of which Mr. Richards has identified by the genitalia, also from Bagley Wood, Boar's Hill, Northleigh and near Shabbington Wood. **C. alticolella* Z. is common in meadows and damp woods on *Juncus articulatus*, though not in every spot where its food-plant grows. At Cothill the cases are not uncommon in early summer on alder-trunks, which the larvae climb in order to pupate. A *Coleophora* resembling *alticolella*, but larger, more distinctly marked, with darker hind-wings, and appearing several weeks earlier, occurs in a meadow by the Upper River near Oxford. In 1925 it was abundant on June 10th and 13th, and a few were still on the wing on July 10th. I had possessed specimens since 1914, regarding them merely as a large form of *alticolella*, until Mr. Richards discovered that the genitalia were quite distinct. It is hoped to obtain and rear larvae of this species before publishing full details. Larvae found in the autumn of 1925 on *Juncus articulatus* growing in the locality in question produced typical *alticolella* only. *C. murinipennella* Dup., or a species which resembles it in appearance (the genitalia do not agree with those of *murinipennella* as described by Dr. Wood¹⁵), is widely distributed in this district among *Luzula campestris*, having been taken in Bagley Wood, in the Boar's Hill and Cumnor district, at Cothill, near Shabbington Wood, and in woods on the Oxfordshire Chilterns; but it is by no means so abundant as in many other districts. *C. antennariella* HS. was introduced to the British list from specimens obtained on the Chilterns near Nettlebed¹⁶; it continues to abound among *Luzula pilosa* in the original locality, but has not been met with elsewhere.

The number of species mentioned in the foregoing list is forty-five—a fairly satisfactory total in view of the botanical and other limitations of the district. Four of these, however, are undetermined or require verification, and two others have been found only on the chalk downs some fifteen or more miles from Oxford. A few of the rarer woodland and other species may yet be looked for.

184 Woodstock Road, Oxford.

January 16th, 1927.

¹⁵ Ent. Mo. Mag., xxviii (1892). p. 176.

¹⁶ Ent. Mo. Mag., lxi (1925), p. 84.

TINEINA IN THE OXFORD DISTRICT.

BY E. G. R. WATERS, M.A., F.E.S.

(Continued from Vol. LXIII, p. 102.)

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiv.

Mr. Meyrick's revised edition of his 'Handbook' furnishes the British Micro-lepidopterist with a stable basis of classification, and is likely to remain for a long time the standard work on our smaller moths. From this point onwards, therefore, I shall follow its divisions and nomenclature as closely as possible.

VIII. HYPONOMEUTIDAE.

The pine-feeders *Ocnerostoma piniariella* Zell., *Cedestis farinatella* Dup. and **C. gysseleniella* Dup. are all fairly common among scattered pines at Tubney. Both species occur also in plantations in Bagley Wood, and I have taken *gysseleniella* at Boar's Hill. *C. farinatella* has been bred in large numbers from larvae collected in March and April, mining down the needles of *Pinus sylvestris* and *P. Laricio* var. *austriaca*, or found sunning themselves externally when full-fed in May. The larva of *gysseleniella*, however, has hitherto eluded me.†

Notes on the conifer-feeding species of *Argyresthia* inhabiting the Oxford district were published in 1921 in Vol. lvii of this Magazine, p. 38. A few details can now be added. **A. atmoriella* Bnks. is apt to be troublesome on larches in Bagley Wood, at Cothill and Tubney, on the downs near Streatley, and probably in many other spots. **A. glabratella* Zell. is now of regular occurrence on spruce, being found in Bagley, Tubney and Wytham Woods, and on the Chilterns near Watlington; in all probability it is generally distributed and even common.* The larvae feed in the winter and spring, mining shoots of spruce from the tips inwards, in much the same manner as *atmoriella* attacks larch twigs, though with less conspicuous results owing to the smaller size of the species. The needles at the end of the shoot first become discoloured, and then drop off for a distance of an inch or more from the tip. This is an insect which should be carefully watched, as one which might develop into a destructive pest; at Tubney in the

* The asterisk indicates that the species may be added to the list of Berkshire Lepidoptera published in the Victoria County History (1906).

† In view of Mr. Meyrick's renewed statement (based on Stainton?) that the larva of *gysseleniella* feeds in a loose web among leaves, it is worth pointing out that an account of the habits of this species was published by J. Trägårdh in Medd. nr. 57 från Centralanst. för forsöksväsendet på jordbruksområdet. Entomol. Afd. nr. 9, Upsala, 1911, and translated into German by K. Mitterberger, in Societas Entomologica, xl., Stuttgart, 1925, pp. 13 and 18. According to Trägårdh the larva of *gysseleniella* is a leaf-miner, like *C. farinatella* and *O. piniariella*, but differs from them in that it mines from the base of the needle upwards.

* Another locality for this much overlooked species is near Wellington College in southern Berkshire.

early months of the year I have seen old spruces whose lower branches were seriously infested, while in Bagley Wood the species is well established in plantations of young trees. The juniper-feeders, *A. arceuthina* Zell., **A. praecocella* Zell., **A. aurulentella* Staint. and *A. dilectella* Zell. are all common, often abundant, on the chalk hills from Radnage (Bucks), across Oxfordshire (Chinnor and Watlington) to Streatley and Moulsoford Downs (Berks). *A. dilectella* occurs also, sometimes in plenty, among planted conifers at Oxford. More local is **A. abdominalis* Zell., a particularly delicate and pretty insect, which has now, however, been captured in some numbers among junipers at Watlington and Radnage, besides one specimen from Streatley.

The British species of *Argyresthia* attached to deciduous trees have all been detected in this district, with the exception of *A. spiniella* Zell. Most of them are generally distributed and plentiful. *A. brockeella* Hübn. and *A. goedartella* Linn., which both abound among birch and alder, produce many striking varieties; both have pure golden forms (*brockeella* then being distinguished by its white thorax and earlier emergence), while *goedartella* varies in the other direction to a plain creamy white (like the common ab. *ossea* Haw. of *A. nitidella* Fabr.). *A. semifusca* Haw. is perhaps less plentiful than most of the others, but has been taken in all parts of the district. The more local species are *A. andereggiella* Dup., which was formerly recorded from Boar's Hill by Mr. N. V. Sidgwick (Berkshire list), and is not uncommon among old crab-apple trees in Bagley Wood; *A. sorbiella* Treits., which occurs among *Pyrus Aria* on the Chilterns at Watlington, but not in the near neighbourhood of Oxford; *A. conjugella* Zell., recorded only from Headington Hill, where Mr. A. W. Pickard-Cambridge finds it regularly on *Pyrus Aucuparia* in his garden; and *A. glaucinella* Zell. Of the last-mentioned only a single example has yet been found—on July 2nd, 1924, resting on the trunk of a rather isolated oak in a lane at Water Eaton.

**Zelleria hepariella* Staint. occurs rarely among ash in Bagley Wood; at Streatley, on the chalk, the moth is locally common, both before and after hibernation.

The five British species of *Swammerdamia* all occur here, and are common with the exception of *S. combinella* Hübn., which has been taken at Yarnton, Watlington and elsewhere, but has never been common in my experience and has not been seen for at least a decade. I have recently found evidence that the larva of the common *S. caesiella* Hübn. begins its career as a leaf-miner—an

unrecorded habit in this genus—and hope to go into the matter more fully another season.

Scythropia crataegella Linn. is locally plentiful in Bagley, Waterperry and Shabbington Woods, the larvae occurring gregariously on blackthorn and hawthorn.

The genera *Prays*, *Hyponomeuta* and *Ethmia* (*Psecadia*) have already been briefly mentioned in earlier papers (September and October, 1923). A word must be added concerning the genus *Acrolepia*, formerly treated by Mr. Meyrick as the ancestor of *Argyresthia* and *Swammerdamia*, but now transferred to the Plutellidae. The only species detected in the Oxford district is **A. pygmaeana* Haw., which is sometimes rather common in the larval stage, mining large blotches in leaves of *Solanum Dulcamara*, at Tubney and in the University Parks at Oxford. In the autumn, and in spring after hibernation (as late as May 10th) the imago may occasionally be disturbed from thatch. In this district the species seems to be habitually double-brooded, larvae found at midsummer producing moths in July, those found in September producing moths in October. *A. granitella* Treits. appears, somewhat unaccountably, to be absent from the district.

IX. LYONETIADAE.

Opostega salaciella Treits. has been captured at Kennington (Berks) and Streatley, flying in dry places on still evenings, but is doubtless much overlooked. *O. crepusculella* Zell. has been taken singly in Bagley Wood (among wood-sage), in a wet lane near Forest Hill (Oxon), and attracted to a lighted window at Oxford.

Leucoptera laburnella Staint. is a universal plague on laburnums. *L. spartifoliella* Hübn. occurs among broom on Cumnor Hurst, and near Nettlebed on the Oxfordshire Chilterns. *L. walesella* Staint. is only to be found near Shabbington Wood, among *Genista tinctoria*, from the leaves of which it has been bred in plenty. *L. scitella* Zell., though less common than in many districts, is generally distributed; the conspicuous blackish blotches made by the larvae may be found in crab-apple leaves at Shotover, South Hinksey, Cothill and in Bagley Wood, and in hawthorn leaves at Bletchington, Yarnton and probably other spots along the Canal. Some empty blotches found on *Pyrus Aucuparia* in Tubney Wood, at the end of August, 1925, are also undoubtedly referable to this species.

Lyonetia clerkella Linn. is common, variable and polyphagous, the larva mining leaves of apple (wild and domestic), pear, cherry,

blackthorn (*Prunus spinosa* and *P. insititia*), hawthorn (native and introduced species), mountain ash, *Cotoneaster frigida*, and (rarely in this district) birch.

The interesting genus *Bucculatrix* is fairly well represented. **B. cristatella* Zell. is locally not uncommon, but is much overlooked owing to its smallness and obscurity; it has been taken on Cumnor Hurst, in Holton Pits, in a meadow near Forest Hill, and on the chalk at Watlington and Streatley, but in the largest numbers near Shabbington Wood. *B. nigricomella* Zell. is fairly common, and has been bred freely from larvae collected in April on ox-eye daisy. **B. frangulella* Göze is particularly plentiful at Cothill on *Rhamnus catharticus*, the leaves being often riddled with the peculiar spiral mines made by its young larvae. On the chalk specimens have been captured at Radnage and Streatley, and the larvae have been seen in plenty on *Rhamnus catharticus* at Hailey (Oxon). *Rhamnus Frangula*, which is said to be the more usual food-plant, is very rare in this district. *B. boyerella* Dup. is sometimes rather common on fences at Oxford, beneath elms; I have captured the moth at Tubney and near Shabbington Wood, and have found its mines on elm at Shotover. *B. cidarella* Zell. is fairly plentiful in one spot at Cothill on alder, the leaves of which are sometimes riddled by its mines in the same way as leaves of buckthorn by *frangulella*. *B. ulmella* Zell. has hitherto occurred very sparingly, chiefly in Waterperry Wood, and once in a small wood at Boar's Hill; an empty cocoon of this species has been found on oak in Tubney Wood. *B. crataegi* Zell. is sometimes rather common, both as imago and as larva, along hawthorn hedges near Shabbington Wood; it has also been taken in Waterperry Wood, and once at Tubney. *B. demaryella* Staint. has hitherto been detected only in Waterperry Wood, where the larvae occur rather sparingly on birch in August.

Oinophila v-flava Haw. inhabits wine-cellars at Oxford, its larva attacking the corks of wine-bottles. It has sometimes been responsible for a serious deterioration in the college port, and I have seen its work in the corks of champagne bottles at the 'Mitre.'

The genera *Bedellia* and *Tischeria*, now included in the *Lyone-tiadae*, have already been dealt with under *Gracilariadae* (Ent. Mo. Mag., lxi, 1925, pp. 188 ff.). On the other hand, mention must be made here of *Phyllocnistis*, now transferred to the *Gracilariadae*. *P. saligna* Zell. is local, occurring among willows at Godstow, Tubney and near Stanton St. John, and frequenting thatch in the

two latter localities. *P. suffusella* Zell. is everywhere common on black and Lombardy poplars. The specimens with the inner half of the forewings unmarked, which (in Ent. Mo. Mag. lxi, 1925, p. 88) I was misled into identifying with *P. tremulella* Zell. (= *sorhageniella* Lüders), are undoubtedly only a common summer form of *suffusella*, which I have now bred in good numbers. It is nevertheless permissible to hope that *tremulella*, which is mainly an aspen feeder,* may yet be detected in this country.

X. TINEIDAE.

This family, as now restricted, is poorly represented in the Oxford district, and can be dealt with summarily. The domestic species, though not less abundant than elsewhere, are for the most part depressingly commonplace. Along with *Tinea pellionella* Linn., *T. fuscipunctella* Haw. and *Tineola biselliella* Hübn., *Tinea pallescentella* Staint. is sometimes common in houses, and shows a preference for emerging in the winter months. A specimen of *T. misella* Zell. has been met with indoors at Oxford, as well as twice in thatch at Tubney. *T. flavescens* Haw. has been bred freely from the remains of a dead pigeon picked up at Oxford. *T. granelle* Linn. has been found in an Oxford flour-mill. *Trichophaga tapetiella* Linn. is not much in evidence, but occurs in out-houses at Cothill and Tubney. *Monopis rusticella* Hübn. is common, usually about houses, but *M. ferruginella* Hübn. has not been found nearer to Oxford than Streatley.

The commonest of the species attached to rotten wood and fungi is *Tinea cloacella* Haw., which occurs everywhere. *T. arcella* Fabr., though not very common, is widely distributed, being recorded from Kennington (Oxon), Tubney and Waterperry Wood, as well as from Highmore and Chinnor on the Chilterns. The other sylvestral *Tineae* are *T. parasitella* Hübn., common on tree-trunks in Wytham, Bagley and Tubney Woods; *T. corticella* Curt., locally rather plentiful among old oaks in Bagley Wood; and *T. fulvimitrella* Sodof., sometimes locally common in Bagley Wood, captured also in Waterperry Wood and in beech-woods near Chinnor. But the most interesting of this group is the much overlooked **Monopis weaverella* Scott, which in the woods of this district almost (but not entirely) supplants *M. rusticella*; it is captured regularly in Bagley Wood and at Cothill, and has been taken in Waterperry Wood and near Shabbington Wood. There are definitely two broods a season, the moth appearing in May and early June, and again in late July and August.

* See Mr. A. Sich's paper in Ent. Record, xxxvii, 1925, p. 97.

During the last few years Mr. A. H. Hamm has made a practice of handing over to me the lepidopterous larvae which he has met with in birds' nests, chiefly around Headington and in the University Parks. Certain common species which feed on wool, feathers, dead leaves and other rubbish have been bred from these in large numbers. *Monopis rusticella* Hübn. has been obtained from the nests of a house-sparrow, a hedge-sparrow, a blackbird, a song-thrush, a greenfinch and a great tit; *Tinea lapella* Hübn. from the nests of a house-sparrow, a hedge-sparrow, a song-thrush, a greenfinch and a spotted flycatcher. *T. pellionella* Linn. has been reared from a hedge-sparrow's nest. *Borkhausenia fuscescens* Haw., *B. pseudospretella* Staint. and *Endrosis lactella* Schiff., belonging to the *Oecophoridae*, complete the list. *Tinea semifulvella* Haw., which is widely distributed in the district (Oxford, Bagley Wood, Bladon Heath, etc.), ought also to be obtained by this method, but has not yet turned up. I take this opportunity of thanking Mr. Hamm for his enlightened co-operation.

The genus *Ochsenheimeria* is probably much overlooked owing to its unusual day-flying habits. *O. birdella* Curt. was once taken by Mr. Hamm in a bog near Cowley, and I have noticed it at North Hinksey; this species at least is likely to be well distributed in the district.

The group of species with case-bearing larvae included by Tutt under the heading Micro-Psychina is not very prominent in the Oxford district. Prolonged search for *Solenobiae* has revealed the presence of only a single colony in the neighbourhood; this is on a rough stone wall at Tubney, where the larvae are not scarce. As they have hitherto produced apterous females only, they may be assigned provisionally to the convenient but ill-defined 'species' *S. lichenella* Linn. Farther afield similar parthenogenetic colonies may be found on beech-trunks in the woods near Nettlebed. Larvae and old cases of *Talaeponia pseudobombycella* Hübn. may frequently be seen on tree-trunks in Bagley and Tubney Woods, but are most plentiful in a small area at Cothill. The only species of this group which is really common here is the apterous and parthenogenetic **Luffia ferchaultella* Steph., whose larvae may often be found in immense numbers—on field-posts at Kennington, on an open fence at Yarnton, on oak-trunks in Tubney Wood, on Lombardy poplars in the University Parks, even on an ancient tombstone in Dorchester Abbey churchyard, as well as on the lichen-covered wall of the church. In Bagley Wood the larvae are well-distributed rather than abundant, occurring on the trunks of

various trees. At Cothill they occur on grey poplar and even alder. To the east of Oxford and on the Chilterns *ferchaultella* seems to be far less common; but I have found its cases on oak in Waterperry Wood, and on beech at Stoke Row. A much rarer insect is **Luffia sepium* Spey. (the *Bacotia sepium* of Tutt), which must be well established in the Oxford district, to judge from its repeated occurrences in recent years. An active larva which I found on an oak-trunk in Bagley Wood on February 25th, 1923, produced a parasite shortly after. A case found near the same spot on February 21st, 1926, produced a moth, which escaped or was destroyed. Mr. O. W. Richards had the good fortune on June 4th, 1925, to discover nine cases of this species on some field-posts at Kennington, and bred the imagines successfully. Perhaps the most unexpected capture was that of a larva found on November 16th, 1923, in my room in Exeter College; it was walking along the kerb of the fire-place, and the only way in which I could explain its presence there was by supposing that it had been introduced with firewood. *Narycia melanella* Haw. is rather frequently met with in the larval stage—on oak-trunks in Bagley and Wytham Woods, on stone walls at Tubney, on old fences at Oxford, etc. The imago may also be found resting on fences in rainy weather. The only record of *N. marginepunctella* Steph. from the near neighbourhood of Oxford is that of a single full-fed larva found on July 13th, 1922, on a post near Yarnton. Farther afield, this insect is not uncommon in beech-woods at Stoke Row on the Chilterns.

184 Woodstock Road, Oxford.

July 21st, 1928.

OBSERVATIONS ON GLYPHIPTERYX SCHOENICOLELLA BOYD.

BY E. G. R. WATERS, M.A., F.E.S.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiv.

It is satisfactory to find that Mr. Meyrick, in the second edition of his 'Handbook of British Lepidoptera,' has recognised *Glyphipteryx schoenicolella* Stt. as a distinct species. The name *schoenicolella* should, however, be attributed to Boyd, whose inadequate description (a mere comparison with *G. equitella* Sc. and *G. oculatella* Z.) appeared in the 'Entomologist's Weekly Intelligencer' for July 31st, 1858, p. 144, whereas Stainton's first description (based on Boyd's) was published in the 'Entomologist's Annual' for 1859, p. 153. Stainton, like Boyd, explained how *schoenicolella* could be distinguished from *equitella* and *oculatella*, with which there is no real danger of confusing it, but omitted to make the much more necessary comparison with *G. fischeriella* Z.

Schoenicolella and *fischeriella* are similar in size and build; the alar expanse varies in both species between six and eight mm., though *schoenicolella* is larger on the average. But *schoenicolella* may always be recognised by the length and curve of the first white dorsal streak, which in *fischeriella*, if not obsolete, is short and straight; while the cilia of the hind-wings, wholly grey in *fischeriella*, become white on the basal half in *schoenicolella*. The last-mentioned feature, strangely overlooked by Boyd and Stainton, enables one to pick out *schoenicolella* at a glance, even in the field—no small advantage, seeing that the two species are sometimes abundant together. Mr. Meyrick has pointed out other differences, notably in the spacing of the white costal streaks.

Schoenicolella is further distinguished by its food-plant, *Schoenus nigricans*, and by various features of its early stages. Whereas larvae of *fischeriella* feed (in seed-heads of *Dactylis glomerata*) in July about a month after the flight of the imago, the next emergence not being till the following May and June, larvae of *schoenicolella* feed from May onwards, and produce imagines the same season. Seed-heads of *Schoenus* collected at Cothill (Berks) on July 2nd, 1928, were found to contain a good supply of larvae, some of which pupated shortly after in small cocoons on the lid of the tin in which they were placed, though many remained inside the seed-heads for pupation. From these larvae about forty examples of *schoenicolella* were bred between July 19th and August 3rd. In 1926, from seed-heads collected on June 31st, moths were bred on August 4th, 6th and 11th; from others, collected on August 14th, a single moth emerged on August 26th.

In favourable seasons and localities, the larva could undoubtedly be found at much earlier dates, probably from the beginning of May. The earliest date on which I have seen the moth in numbers at Cothill is June 12th, 1927, but Boyd found it swarming at the Lizard on May 29th, 1858, and I have a single example captured at Cothill as early as May 26th, 1916. Later dates are also possible; the moth was still fairly plentiful at Cothill on August 29th, 1927, while examples in the British Museum bear the dates September 19th, 1871 (Barrett), and September 21st and 23rd, 1848 (Stainton). No British *Glyphipteryx* is known to be double-brooded, and I have not succeeded in finding larvae of *schoenicolella* in the autumn (when, moreover, the seed-heads become dry). We may conclude that *schoenicolella* is probably single-brooded, but that the larvae feed at any time from early May to August, the moth being on the wing at any time from late May to late September.

The larva of *schoenicolella*, when full fed, is about four mm. in length and one mm. in diameter; pale yellowish-green, the head and prothoracic plate shining black, the dorsal vessel dark grey, the anal segment and plate of the penultimate segment black, hairs scanty and rather short. The larva of *fischeriella*, of which I had a large number before me in July, 1928 (cf. Stainton, Nat. Hist. Tin., XI, p. 272, and figure), is similar but distinctly smaller; on the penultimate segment it has blackish dots anteriorly and a transverse blackish line posteriorly, but no black plate.

Schoenicolella is widely distributed in southern England, and would probably be found in any locality where its local food-plant is plentiful. Besides Cornwall (the Lizard) and Berkshire (Cothill), it is known to occur in Kent (two of Stainton's specimens in the British Museum are from Lewisham), the Isle of Wight (a specimen captured at Yarmouth by Mr. Fletcher, see 'A Guide to the Natural History of the Isle of Wight,' edited by F. Morey, Newport and London, 1909, p. 435), Norfolk or Cambridge (two taken by Barrett in the British collection, and one taken by E. A. Atmore in the Bankes collection at South Kensington, all three without data), and Dorset. In the last-mentioned county, or at least its south-eastern portion, the species appears to be common; a long series in the Bankes collection includes twelve examples labelled 'Corfe' and six labelled 'Wych,' while Mr. A. W. Pickard-Cambridge possesses a long series from Bloxworth, and I myself took it at Poole, on August 29th, 1920. On the Continent it seems to be unknown, but must surely occur.

184 Woodstock Road, Oxford.

October 14th, 1928.

A NEW *COLEOPHORA* OF THE RUSH-FEEDING GROUP

BY E. G. R. WATERS, M.A., F.E.S.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxx.

Coleophora tamesis, n. sp.

Antennae about $\frac{3}{4}$; basal joint somewhat thickened; ochreous-whitish, thickly ringed with ochreous or fuscous from beyond basal joint to apex, the rings occasionally reduced to spots on the underside. *Labial palpi* with terminal joint slender and finely pointed, more than half the length of the second joint; ochreous-whitish. *Head* ochreous, paler on sides. *Thorax* ochreous. *Forewings* ochreous, sometimes mixed with light fuscous in the interneural spaces towards apex; costa, margins of cell, costal and terminal veins, submedian fold and dorso-terminal margin marked with whitish lines, sometimes obscure or obsolete on dorsal half of wing; *cilia* ochreous-grey. *Expanse* 12-14 mm. *Hindwings* grey; *cilia* about 4, ochreous-grey. *Underside*: *forewings* grey, apex suffused with ochreous; a fine whitish line along costa from near base; costal and apical *cilia* ochreous; terminal *cilia* ochreous-grey, ochreous at base; *hindwings* grey, apex suffused with ochreous, *cilia* ochreous-grey, ochreous at base on costa towards apex. *Abdomen* grey; *anal tuft* in both sexes ochreous or ochreous-whitish. *Legs* ochreous-whitish, grey on outer sides. (Described from thirty-seven specimens. The type, a male, has been deposited, together with a female, in the Oxford University Museum, Hope Department.)

Habitat: ENGLAND: Oxfordshire: Binsey, near Oxford, since 1914; Otmoor, 1928.

The principal known locality for this insect is a short stretch of water-logged ditch and the adjacent portion of a meadow; it is in Oxfordshire, though on the right bank of the Thames. A narrow tow-path alone separates it from the river, the proximity of which is commemorated in the proposed name. It is a spot remarkably rich, considering its small extent, in both plants and insects; in particular, it is the chief or only surviving locality near Oxford for quite a number of river- or fen-loving Micro-lepidoptera. May it long escape the 'improvements' which the Thames Conservancy is inflicting on the riverside a short distance away! Two damaged examples of the *Coleophora* here described, captured at Binsey on July 1st, 1914, and June 21st, 1915, respectively, have long been in my collection; they were placed among specimens of *C. galactaula* Meyr. (erroneously identified, till this year, with *C.*

alticolella Zell.¹), but with some misgiving on account of their large size and yellowish colouring. It was not till June 10th, 1925, that I found similar moths abundant in the same locality, flying freely in evening sunshine, and realized that they were probably a species distinct from *galactaula*. A few days later Mr. O. W. Richards accompanied me to the spot and collected specimens for an examination of the genitalia; this enabled him to declare without hesitation that the moths belonged to the rush-feeding group of *Coleophora*, but were distinct from any known species. Since 1925 the new species has been seen there repeatedly, though not in the same abundance. On July 12th, 1928, I captured specimens in another locality over six miles distant from the first, along a wet ditch crossing the ancient swamp (now drained) of Otmoor; Mr. Richards has kindly identified some of these by examining the genitalia.

The genitalia show *C. tamesis* to be closely allied to *C. murinipennella* Dup., which it resembles in size (though larger on the average) and in the conspicuousness of the whitish streaks on the forewings. But there is no danger of confusing these two species, the ground-colour of *murinipennella* being always definitely grey, that of *tamesis* always ochreous. It was less easy to detect any superficial character which would separate *tamesis* with certainty from *C. galactaula*. *Tamesis* is considerably larger on the average, its expanse being hardly ever less than 12 mm., whereas normal examples of *galactaula* have an expanse of 10-11 mm. The ground-colour of *galactaula* is often greyish, whereas that of *tamesis* is always clear ochreous. But *galactaula* occasionally attains an expanse of 12 mm., and is sometimes ochreous with no grey tinge. I therefore submitted a series of each species to Mr. Meyrick, who with his wonted helpfulness and acumen pointed out that there was a constant difference in the structure of the palpi. Whereas in *galactaula* the terminal joint of the palpi is short and rather blunt-pointed, less than half the length of the second, in *tamesis* the terminal joint is slender and fine-pointed, more than half the length of the second. *Tamesis* flies later than *murinipennella*, which is a May insect, and earlier than *galactaula*, which only begins to emerge in late June; nevertheless it overlaps with *galactaula*, being still common enough in July. In 1927, owing perhaps to the exceptionally cold summer, *tamesis* was still on the wing, in small numbers, as late as August 6th.

An apology is perhaps needed for thus describing a new species

¹ Cf. E. Meyrick in 'Entomologist,' LXI (1928), p. 91.

of *Coleophora*, especially one belonging to the obscure group of rush-feeders, without some account of its early stages. Seeing how restricted its habitat is, I fully hoped and expected to find the case-bearing larva and rear the moth before introducing the species as new.² Unfortunately my repeated searches at different times of the year have been unsuccessful, and the early stages remain unknown. In the Binsey locality the only species of *Juncus* at all plentiful is *J. articulatus*; *Coleophora* larvae are not uncommon there on this plant, but have produced *C. galactaula* only. *Juncus compressus* is present, but is too irregular in appearance and scarce to be the food-plant. Another possibility is *Luzula campestris*, which, however, is difficult to find after the spring and seems to be grazed off by cattle. Mr. Meyrick suggests that *tamesis* is likely to be a *Luzula*-feeder (like *C. sylvaticella* Wood and *murinipennella*) on account of its relatively large size, the *Juncus*-feeding species being necessarily restricted in size by the conditions of their larval stage. The unusually long ovipositor doubtless bears some relation to the food-plant. Pending the solution of this mystery, it has been thought desirable to give the species a name, so that it may figure in a forthcoming list of the Micro-lepidoptera of the Oxford district.

184 Woodstock Road, Oxford.

December 8th, 1928.

THE GENITALIA OF *COLEOPHORA MURINIPENNELLA* DUP. AND ALLIED SPECIES.

6 A

BY O. W. RICHARDS, M.A., F.E.S.

PLATE I.

I have been asked by Prof. E. G. R. Waters to give some account of the genitalia of the new species of *Coleophora* he describes (*ante* p. 1), and I have taken the opportunity to figure these structures in two allied species.

Although *C. tamesis* Waters is superficially so like *C. galactaula* Meyr., the genitalia show it to be much more closely allied to *C. murinipennella* Dup. Dr. Wood (Ent. Mo. Mag., Vol. XXVIII, pl. 4, figure not numbered), has figured the genitalia of a moth he calls *C. murinipennella* Dup., but the structures shown in his plate are quite unlike any *C. murinipennella* Dup. I have examined, and appear to represent some quite distinct, presumably undescribed, species. The figures in the present paper (figs 1 and 4) have been prepared from specimens in Wood's own collection, now on loan at the British Museum (Natural History).

² Cf. Ent. Mo. Mag., LXII (1927), p. 102

Evidently the actual specimen Wood figured was a different species which through some mischance had been included in his series, for specimens from Oxford which have the habits of *C. murinipennella* Dup. (as described by Wood) agree in structure with the specimens here figured.

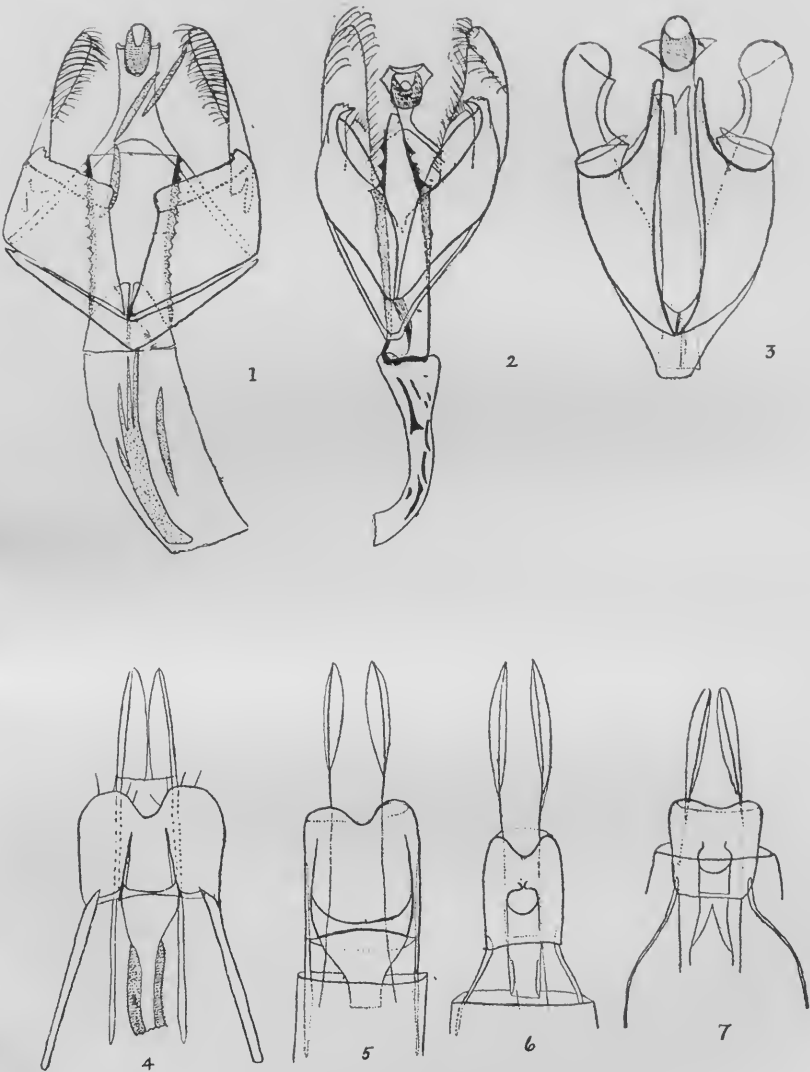
It will be noticed that *C. tamesis* agrees with *murinipennella* in the male in the peculiarly toothed supports of the oedeagus, which is very broad, but the species differ considerably in the shape of the clasper and in the number and shape of the eversible spines attached to the vesicle. The females, also, agree in the structure of the eighth sternite, but in *C. tamesis* the mouth of the duct of the bursa copulatrix is much wider.

C. galactaula Meyr. in each sex is very different from the two preceding species. Two specimens are figured to show the variation in the shape of the mouth of the bursa-duct. That illustrated in fig. 6 resembles Wood's figure (loc. cit., pl. iv) fairly closely but, as is shown in fig. 7, the mouth may often be much more widely open, all intergradations occurring. There is also a certain amount of variation in the proportions of the length and breadth of the eighth sternite.

EXPLANATION OF PLATE I.

- FIG. 1. Genitalia of ♂ *C. murinipennella* Dup., seen from below. Specimen from the Wood collection.
FIG. 2. The same of ♂ *C. tamesis* Waters.
FIG. 3. The same of ♂ *C. galactaula* Meyr. (hairs of the apical part of the claspers not shown).
FIG. 4. The ovipositor and eighth sternite of ♀ *C. murinipennella* Dup., seen from below. Specimen from the Wood collection.
FIG. 5. The same of ♀ *C. tamesis* Waters.
FIG. 6. The same of ♀ *C. galactaula* Meyr. Specimen from Tubney, Berks.
FIG. 7. The same. Specimen from Cothill, Berks.

Dept. of Entomology, Imperial College of Science and Technology.
December 11th, 1928.



GENITALIA OF COLEOPHORA.

O. W. R. del.

NOTES ON SOME SPECIES OF *LITHOCOLLETIS*, WITH AN
ADDITION TO THE BRITISH LIST.

BY E. G. R. WATERS, M.A., F.E.S.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxx.

The days of enthusiasm when Stainton and his fellow entomologists 'bred *Lithocolletides* till they were tired,'¹ or when Mr. E. R. Banks, by breeding *Lithocolletides* in hundreds from fruit-trees, solved the mystery of *concomitella* and its allies,² are now long past; and the genus *Lithocolletis*, in common with most other small Micro-lepidoptera, seems to be almost entirely neglected by British entomologists of the present day. This neglect is undeserved, for, apart from the extreme beauty of many of the species, the *Lithocolletides* present interesting problems of various kinds. Their distribution even in this country is imperfectly known, and undetected species certainly await discovery. The habits of many of them require elucidation; who will discover the larva of *ulicicolella*, or prove that *comparella* hibernates in the imaginal stage, or show what happens to the winter brood of *messaniella* where it feeds on deciduous trees, or explain why larvae of *nigrescentella* are to be found feeding in April as well as in the autumn? Above all, the variation of many species in this genus is full of interest; we find much instability in the wing markings (which are often unsymmetrical even in a single individual), convergent variation in different species, seasonal and local variation, and variation

¹ Natural History of the Tineina, I, 1855, p. 30.

² See Ent. Mo. Mag., xxxv, 1899, pp. 241 ff

depending on the food-plant. Several groups of species are extremely similar, and have evidently acquired their specific characteristics in quite recent times; while several existing forms, though not yet specifically distinct, must be regarded as species in the making. In the following notes I do not pretend to solve problems, but merely to put on record my observations on some of the less-known species.

Lithocolletis anderidaë Fletcher. This pretty species enjoys the distinction of being, on an average, the smallest of the British *Lithocolletides*, having a wing-expanse of from 4 to 6 mm. only. Very little has been heard of it since it was discovered in Abbot's Wood, Sussex, by Mr. W. H. B. Fletcher,³ and detected at Bloxworth, Dorset, by the Rev. O. Pickard-Cambridge and Mr. N. M. Richardson.⁴ The only additional locality recorded since 1890 seems to be Tilgate Forest, in Sussex.⁵ The sight of a short series from Bloxworth in the collection of Prof. A. W. Pickard-Cambridge gave me a clear idea of the species, and induced me to hunt for it—with immediate and unexpected success. Some *Lithocolletis* mines collected from birch (*Betula alba* and *B. pubescens* indiscriminately) on July 29th, 1928, in various spots on Ockley Common, a boggy heath in south-west Surrey, produced four examples of *anderidaë* between August 6th and 9th, along with a much larger number of *L. ulnifoliella* Hübn. Returning to the same locality on October 6th, 1928, I searched for more mines, but for a long time without success; until, just as dusk was falling, in a shallow boggy depression somewhat sheltered by trees and a bank, I came across some minute bushes of *Betula pubescens*, mostly not above six inches high and hidden in heather, on which small *Lithocolletis* mines were plentiful, some bushes having every leaf distorted by one or more larvae. In a few minutes, with my wife's aid, I collected several score, strongly suspecting on account of the small size of the mines that they must be *anderidaë*. When brought indoors in January, the pupae responded readily to warmth, and some forty moths emerged between February 2nd and March 1st, all without exception being *anderidaë*. Several new facts are thus established. A Surrey locality can be added to those already known. As stated in Meyrick's Handbook (on what authority?), there is a brood of larvae in July and of imagines in August. The food-plant is the downy-leaved birch, *Betula pubes-*

³ See Ent. Mo. Mag., xxii, 1885, p. 40

⁴ Ibid., xxvi, 1890, pp. 192 and 243; LIII, p. 114.

⁵ The Victoria History of the Counties of England: Sussex, I. [1906], p. 208: probably on the authority of Mr. Fletcher himself.

cens;⁶ mines collected in the same locality on *Betula alba* have produced *L. ulmifoliella* only. Whether the Sussex and Dorset specimens were bred from *Betula alba* or *B. pubescens* has never been explicitly stated; the published records say merely 'birch,' which is interpreted in Staudinger and Wocke's 'Catalog'⁷ as *Betula alba*, though *B. pubescens* is equally possible. My experience shows that *anderidae* is not necessarily so scarce as is supposed. In all probability it would be found, if systematically searched for, on other boggy heaths in the South of England, and perhaps in other parts of the country.

In at least one respect the accepted description of *anderidae* requires revision. The central white fascia, which was described by Fletcher as 'angulated on the side nearest the base, but less so on the outer side,' is very irregular in form, and sometimes differs even in the forewings of a single individual. It is occasionally quite straight, more often obtusely angulated, sometimes sharply angulated in the middle, and frequently rounded (inwardly convex); while in a few of my specimens it is divided by an arm of the golden ground-colour into two opposite spots, the white markings then consisting of four costal and three dorsal tooth-shaped spots.

It should be added that *anderidae* can no longer be regarded as an exclusively British product, Herr W. Petersen having obtained the species on a moor near Nõmme, Esthonia. With great kindness, he has sent me three handsome examples of the moth, as well as some mines. In his account of this discovery, which is accompanied by a description of his specimens and figures of the genitalia,⁸ he notes as striking characteristics of *anderidae* its small size and the variability of its markings. The Esthonian *anderidae* are, nevertheless, larger than my own examples, ranging from 4.5 to 6.5 mm. in expanse, and exceptionally attaining 7 mm.; in other respects they agree perfectly with British *anderidae*. At Nõmme the larvae are found only on *Betula nana* and on hybrids between that species and *B. pubescens*. Herr Petersen has therefore made (in a letter to me) the interesting suggestions that *anderidae* in the south of England is a relic of the glacial age, that its normal food-plant is *Betula nana*, and that it transferred itself to another species of birch (hybrids probably serving as intermediaries) when *B. nana* became extinct there. The fact that

⁶ Treated in the older botanical books as a variety or a sub-species of *Betula alba*; now usually regarded as a species. Micro-lepidoptera attached to birch frequently show a decided and even exclusive preference for one species or the other.

⁷ 1901 edition, part II, no. 4126.

⁸ Stettiner Entomologische Zeitung, LXXXVIII, 1927, pp. 136 ff.; see also p. 122.

the present food-plant is *B. pubescens*, which is much closer than *B. alba* to *B. nana*, lends plausibility to this conjecture. *Anderidae* may be expected to occur in other parts of Northern Europe, and in particular it should be looked for in Scotland or the North of England on *B. nana*.

L. cavella Zell. Meyrick's 'Handbook' mentions only Kent, Essex and Hereford as localities for this species. It is, however, much more widely distributed, and would probably be found in most parts of the south of England, if looked for. It has been recorded on reliable authority from various places in Sussex⁹ and Surrey,¹⁰ and I have myself bred examples this year from Hindhead in south-west Surrey. The moth has also been obtained in Dorset (a series from Bloxworth in the collection of Prof. A. W. Pickard-Cambridge) and Hants (Poundhill Enclosure in the New Forest).¹¹ In Berkshire I have captured *cavella* near Wellington College in the south-east (1926 and 1929), and bred examples from Tubney Wood in the north of the county (1924 and 1929). Its large mines seem to occur only on *Betula alba* (not *B. pubescens*). Brightly coloured examples of *L. spinolella* Dup. with the central fascia angulated sometimes come close in general appearance to *cavella*;¹² but they may always be distinguished by the form of the white basal streak. In *spinolella* the streak is shorter (seldom over $\frac{3}{4}$) and broader, and widens evenly towards its apex, where it is abruptly truncated; in *cavella* the streak is longer (often reaching $\frac{2}{3}$) and narrower, and after widening beneath just before the apex, has its upper edge prolonged into a point, the general shape being that of a cricket-bat viewed sideways.

L. geniculella Rag. My expectation that this insect, which is common in the Oxford district, would be found elsewhere in Britain¹³ has already been fulfilled. On October 8th, 1928, I found its mines commonly on sycamore (*Acer Pseudo-platanus*) on Mickleham Downs in Surrey—formerly the happy hunting-ground of Stainton and his friends, who would surely have noticed so conspicuous a *Lithocolletis*, had it occurred there in their day. Unfortunately I did not take proper care of the few leaves that were collected, and only two imagines were bred from them; but these are both particularly interesting specimens. One is an

⁹ Victoria History: Sussex, I [1906], p. 208.

¹⁰ Ibid., Surrey, I [1902], p. 149.

¹¹ See Entomologist, I., 1917, p. 15.

¹² Cf. Ent. Mo. Mag., LXI, 1925, p. 102; but one of the specimens there alluded to was an actual example of *cavella*, bred probably from a birch-leaf which by some oversight had been placed among sawfly leaves. Herr W. Petersen was good enough to verify this by examining the genitalia.

¹³ See Ent. Mo. Mag., LXIV, 1928, p. 12.

example of the aberration *pseudoplataniella* Rag., not hitherto noticed in this country. In this form the first dorsal wedge-shaped spot, instead of forming an acute-angled fascia with the corresponding costal spot, is reduced to a dark spot on the dorsum, being separated from the costal spot by an interval of the ground-colour. Originally described as a species,¹⁴ it is now generally regarded, in spite of its distinct appearance, as a form of *geniculella*.¹⁵ Sorhagen mentioned that he had seen specimens in which one wing had the markings of *geniculella*, the other of *pseudoplataniella*; and in this connection it is worth pointing out that in my specimen the separation of the costal and dorsal spots is much less complete on one side than on the other. Evidently *pseudoplataniella* is an aberration, not a local or seasonal form, of *geniculella*. The second of my Mickleham specimens is an aberration of a different type. Its first fascia is angulated, but does not end in a fine point, and there is no dark line extending from the angle to connect it with the second fascia. This form approaches certain forms of *L. sylvella* Haw., and it therefore seems desirable to point out that the most reliable distinction between *sylvella* and *geniculella* is to be found, not in the fasciae, but in the basal markings. In *sylvella* two parallel transverse dark lines near the base form the margins of a basal fascia. In *geniculella* the basal markings consist of a short line along the base of the costa, a small spot (sometimes absent) on the base of the dorsum, a short costal streak pointing towards the tornus, and an erect dorsal streak pointing to the base of the costal streak; these markings are sometimes more or less connected up, but never form two parallel lines. I would urge any entomologist who can find *Lithocolletis* mines on sycamore to assist in studying the forms of this interesting moth, by collecting the mines in July or October, and breeding series from fresh localities.

In the *Annales de la Soc. Entom. de France*, 1920, pp. 405 ff., J. de Joannis has unravelled with remarkable skill the tangled problem of the *Acer*-feeding *Lithocolletides*. He treats *pseudoplataniella* as Ragonot's specific name for the sycamore-feeder, with priority over *geniculella*, but displaced in its turn by Zeller's name *acernella*; at the same time he replaces Haworth's name *sylvella* by Zeller's *acerifoliella* for the maple-feeding species. I am, nevertheless, reluctant to abandon the accepted names on the

¹⁴ In *Petites Nouvelles Entomologiques*, 1873, no. 86, p. 346, and *Annales de la Soc. Entom. de France*, 1874, p. 600; figure *ibid*, 1876, plate 6, no. 9.

¹⁵ Cf. L. Sorhagen, in *Illustrierte Zeitschrift für Entomologie*, V, 1900, pp. 249 f.; Standinger-Rebel, *Catalog*, II, no. 4112.

technical grounds urged. It was Ragonot who first clearly separated the sycamore- from the maple-feeding species, and bestowed the name *pseudoplataniella* on a particular form of the former; I venture, therefore, to continue using his names, with the connotation that he gave them.

L. junoniella Zell. This species, usually regarded as a northern insect, is common on the moorlands of the Welsh border, and may be expected to occur in any part of Wales or western England where its food-plant, *Vaccinium Vitis-idaea*, is plentiful. I have found it on the Black Mountains, both in Monmouthshire (an old mine seen near Llanthony, at an elevation of about 1,600 feet, on July 9th, 1928) and on the eastern edge of Brecknock (an imago captured and empty mines seen on Hay Bluff, at 2,200 feet, July 14th, 1926); while Dr. J. H. Wood recorded the species from the western border of Herefordshire.¹⁶ On the fine moors of Radnor Forest, so thickly clad with heather and *Vaccinium*, it is locally common, between 1,500 and 2,000 feet up; the imago (presumably of the second brood) was flying freely there in evening sunshine on July 16th, 1926, and the mines were found in great abundance between April 20th and 23rd, 1929. Unfortunately, the fact that the larva feeds in the early months of the year, when there are few other small larvae about, seems to expose it to an unusual degree to the attention of parasites. From a large number of mines collected this spring (probably not less than 200) only seven imagines were bred, and these appeared to come chiefly from larvae that had begun feeding late and were immature when collected; the remainder, apart from a few casualties due to other causes, all produced a species of *Bracon*. The supposed preference of this moth for a shady habitat¹⁷ certainly does not prevail in the localities just mentioned, which are bare of trees, and where *Vaccinium Vitis-idaea* grows only on the open moors.

L. salicicolella Sirc. A striking form of this species, not determinable as *salicicolella* by the usual tests,¹⁸ deserves to be recorded. In it the golden ground-colour is more or less completely suffused with fuscous, and the markings are unusually white and clear; the first costal and dorsal spots are combined into a curved or angulated fascia; the spot near the base of the dorsum is much enlarged, and tends to coalesce with the medium basal streak. Eight imagines, which I bred in the winter of 1924-25, from leaves

¹⁶ Victoria History: Herefordshire, I [1908,] p. 96.

¹⁷ Cf. Stainton, Nat. Hist. Tin., II, 1857, p. 178.

¹⁸ Cf. Stainton, Nat. Hist. Tin., II, 1857, pp. 60 and 68.

of *Salix cinerea* collected the previous August at Dolwyddelan, Caernarvonshire, were all of this form, or modifications of it. They were so remarkably uniform in size (6 to 7 mm.) and appearance, and so different from ordinary *salicicolella*, that I regarded them for some time as an undescribed species; but Herr W. Petersen, to whom I submitted specimens, has found the genitalia to be identical with those of *salicicolella*. Recently I have captured and bred (again from *Salix cinerea*) several exactly similar examples from Yarnton, Oxfordshire, along with typical *salicicolella*. Another example in my possession, bred from willow in 1923, comes from the northern side of Cader Idris, in Merioneth. In view of its evident tendency to form a local race, I venture to name this form ab. (? var.) *fusca*, and am depositing the type specimen in the Hope Department at the Oxford University Museum. From *L. spinolella* Dup., which it resembles in having a clear white fascia, it may be distinguished by its smaller size and by the long and fine basal streak. In several respects (the fuscous ground-colour, the white fascia, and the tendency of the dorsal spot to unite with the basal streak) the new form comes remarkably close to *L. viminetorum* Staint.; from that species it may be separated, not only by the difference of food-plant (*viminetorum* being confined to *Salix viminalis*), but also by the more shining white of the markings, which stand out more sharply, and contrast more vividly with the ground-colour.

L. strigulatella Zell. Though in all probability it has been artificially introduced, this pretty insect is a welcome addition to the British list. Its occurrence has already been announced in my 'List of the Micro-lepidoptera of the Oxford District,'¹⁹ but I take this opportunity to give more particulars. An unfamiliar tree is always (or should always be) an object of interest to the Micro-lepidopterist; consequently, I have been interested during the last year or two in some strange-looking alders, growing in a recently-felled copse at Cothill, Berks, which proved on investigation to be the continental hoary alder, *Alnus incana*.²⁰ In October, 1928, I found that the leaves of these bushes contained numerous *Lithocolletis* mines—small oval underside blotches, reddish-brown beneath, often several in a leaf—some of which I collected. Brought indoors at Christmas, in less than a fortnight these mines began producing imagines, which proved to be not (as I fully expected) one of the British alder-feeding species, but

¹⁹ In the Report of the Ashmolean Natural History Society of Oxfordshire for 1928, p. 52.

²⁰ Dr. G. C. Druce has kindly corroborated this identification.

L. strigulatella, a species which abounds on *Alnus incana* on the Continent, but has not hitherto been noticed in this country. Between January 7th and February 5th there emerged over eighty examples, all of the same species.

Strigulatella is satisfactorily described by Frey²¹ and Wocke,²² and is figured by Spuler.²³ It varies considerably in size (expanse from 6 to 10 mm.). An average specimen rather closely resembles *L. nigrescentella* Logan, not only in size and build, but also in its reddish-golden ground-colour; while the white-tipped antennae remind one strongly of *L. lautella* Zell. *Strigulatella*, however, has no fascia, but a white basal streak and four costal and three dorsal white tooth-shaped spots; and it is readily distinguished from any closely-allied species by the first costal spot, which points towards the tornus, and is usually prolonged so that it terminates midway between the apices of the first and second dorsal spots.

It is difficult to believe that *strigulatella* can have been introduced into Britain except with the tree on which it feeds. Unfortunately I have not been able to ascertain how long the bushes in question have been there. The owner of the ground (Mr. W. T. Morland, of Abingdon), who has very kindly made inquiries on my behalf, assures me that no replanting has taken place in that spot for the last fifty years, and considers the bushes in question to be seedlings such as always spring up after a cutting of the alders. It is possible, but by no means certain, that a predecessor of his, who was interested in foreign trees, planted the foreign alder as an experiment about 1851. Possibly, therefore, *strigulatella* has been there for many years, but confined to its particular trees, and inaccessible in the dense covert. One would have expected it to stray sometimes, as it does on the Continent, on to *Alnus glutinosa*; but I have bred and captured large numbers of *Lithocolletides*, of all the four British alder-feeding species, from alders growing close by, without coming across a single *strigulatella*.

184 Woodstock Road, Oxford.

June 25th, 1929.

²¹ Die Tineen und Pterophoren der Schweiz, Zürich, 1856, p. 332.

²² Heinemann und Wocke, Die Schmetterlinge Deutschlands und der Schweiz, III, 2, 1876 p. 684.

²³ A. Spuler, Die Schmetterlinge Europas, II, Stuttgart, 1910, plate 90, fig. 32.

A NEW NEPTICULA FROM NORTH WALES.

BY E. G. R. WATERS, M.A., F.E.S.

*Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiv.**Nepticula spinosissimae*, n. sp.

IMAGO. *Antennae* $\frac{1}{2}$, shining fuscous. *Head* long-haired, black; *antennal eyecaps* white or pale ochreous; *collar* pale ochreous. *Thorax* shining pale bronzy. *Forewings* uniform shining pale bronzy, with grey and coppery reflections when viewed obliquely; *cilia* grey. *Expanse* 3-4 mm. *Hindwings* shining grey, slightly bronzy; *cilia* about 5, grey. *Underside* of both fore- and hindwings fuscous, rather shining; *cilia* grey. *Abdomen* shining dark grey. *Legs* shining pale bronzy above, whitish beneath. (Described from 10 specimens. The type, a male, has been deposited, together with a female, in the Hope Department of the Oxford University Museum.)

EGG a silvery globule, appearing black when the larva has filled it with frass; placed anywhere on a leaflet of *Rosa spinosissima* L., usually on the upper surface, seldom (6 instances out of 47 examined) on the under surface.

LARVA about 3 mm. long when full-grown; bright amber-yellow; mining leaflets of *Rosa spinosissima*. *Mine* a long gallery; very slender and inconspicuous at first, it widens gradually and ultimately attains a width of about 1.5 mm.; the gallery wanders at first in the vicinity of the egg, but on reaching the leaf-edge it follows the edge for some distance, often encircling the greater part of the leaflet; since the larva excavates each successive serration, the gallery along the leaf-edge forms a succession of small curves or undulations; on reaching or nearing the base of the leaf, or sometimes sooner, the gallery doubles back and forms another wide curve just inside the first, often encroaching on the first; the doubling process is repeated if necessary, the central portion of the leaf being touched only in the last resort; in small leaflets the mine assumes the appearance of a blotch occupying the whole area except the very base; in large leaflets the mine is occasionally confined to one side of the midrib; when the mine has started near the centre of the leaflet, the later portions cross and often obliterate the early portion; in the longest examples the total length of the gallery, if straightened out, would approach 40 mm. *Frass* black; at first entirely fills the gallery, but as the gallery widens it becomes a thick central line, occupying in the later portion from $\frac{1}{4}$ to $\frac{1}{2}$ the width of the gallery, with an opaque greenish-yellow margin on either side; the thickness of the line varies considerably, probably owing to inequalities of the food supply; occasionally the frass is more scattered, the separate grains being discernible, but the tendency to form a central line is almost always visible. The gallery terminates in a small chamber, rectangular with rounded corners, about 3×1.5 mm., free from frass. The larva quits the leaf through a semicircular slit in the upper cuticle, on or near that edge of the chamber which is farthest from the exit of the gallery.

COOCON a somewhat flattened ovoid, unusually long, 2×1 mm. or a trifle larger, broader at the end from which the imago emerges; dark brown or blackish; placed in some groove or angle of a leaf (or of tissue paper, in captivity); the groove or angle is often artificially formed, or held in position, by means of some strands of pale silk stretched over the cocoon. *Pupa-case* (when empty) brown or dark fuscous, hardly transparent; projecting from the cocoon after the emergence of the imago.

The larvae which produced this interesting little moth were found on September 15th, 1927, on some coast sandhills at Llan-dudno (Caernarvon), where the pretty burnet-rose manages (with

some difficulty) to hold its own against golfers and holiday-makers. Being always anxious to ascertain the range of food-plants of the smaller Lepidoptera, I seized an opportunity of searching some of the rose-bushes for leaf-mining larvae, not expecting to find anything more than *N. anomalella* Gz. or *N. centifoliella* Z., or possibly the little-known *N. hodgkinsoni* Stt. The search resulted in the discovery of about thirty *Nepticula* mines containing larvae, besides many empty mines, all of one type. Unfortunately I omitted to make a detailed description of the larvae, but hope to make good this deficiency at some future date. Some of them died in the mines, but about two dozen completed their feeding and formed cocoons. These were brought indoors in the first half of December and put in a warm place. On December 29th a moth, not agreeing with any known species, was found to have emerged; at the same time another empty pupa-case was discovered, the moth from it having escaped by some mischance. Further examples appeared on January 21st, January 28th to February 2nd (one each day) and February 11th (two). Mr. E. Meyrick, to whom I submitted the first specimen, had no hesitation in pronouncing it to be an undescribed species.

Spinosissimae comes very close, in its imaginal stage, to *N. minusculella* H.-S., but may be separated from that species without difficulty by its brighter colour, due to the absence from the forewings of any purplish tinge. From *N. nylandriella* Tgstr., which it also resembles, it can be readily distinguished by its warmer colouring and black head. From all other British *Nepticulae* without pale markings, including the rose-feeders *N. anomalella* Gz. and *N. fletcheri* Tutt (which are perhaps a single species), it is distinguished by the entire absence of any purplish colouring or dark suffusion. The larva, being yellow, cannot be confused with the green larvae of *minusculella* and *nylandriella*. The mine is characteristic; an interesting feature, seen also in the mines of other *Nepticulae* which feed in small leaflets (such as *N. poterii* Stt. on *Poterium Sanguisorba*, or *N. serella* Stt. on *Potentilla Tormentilla*), is the extreme care with which the larva, as it circles within the leaflet, avoids biting through the lower part of the midrib and interrupting its own food-supply. It is probable that a careful search would reveal the presence of this insect in other localities where *Rosa spinosissima* flourishes. The readiness with which it responds to warmth indicates that in nature it is double- or continuous-brooded.

184 Woodstock Road, Oxford.

March 22nd, 1928.

NOTES ON THE NEPTICULIDAE.

BY E. G. R. WATERS, M.A., F.E.S.

 Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiv.

The splendid work done in past years on the British *Nepticulidae* by Stainton, Tutt, Dr. J. H. Wood, and other distinguished entomologists now departed has by no means exhausted the subject. In connection with these fascinating insects there still remain many obscurities, especially with regard to the limits of species and various points in their life-history; while the range of food-plants and the geographical distribution are in many instances still imperfectly known, and new or unobserved species undoubtedly await detection. The purpose of the following notes, based on personal observations, is to throw light on obscure points or to draw attention to problems hitherto overlooked.

NEPTICULA ASSIMILELLA Z.

In Vol. LX (1924) of this Magazine, p. 102, I mentioned the occurrence in the Oxford district of a *Nepticula* on the grey poplar (*Populus canescens*). While some *Nepticulae* are extremely easy to rear, others seem to be exceptionally difficult, and the insect in question belongs to the latter category. Larvae were found at Cothill (Berks) each successive September from 1923 to 1927, sometimes in good numbers, yet every batch proved a failure until the present year, partly owing to parasites, partly no doubt owing to mismanagement on my part. The yellowish-green larva and its mine—a long widening gallery with central frass-line, either curved or angular, and sometimes compressed into an apparent blotch—were not unlike those of *N. trimaculella* Hw., the common species on black poplar; but whereas the mine of *trimaculella* runs away from the egg at the very outset, the mine of this species was noticed always to begin with a tiny bunch of convolutions, or at least to circle once or twice round the egg, resembling in this respect the mine of *N. assimilella* Z. The larva also agreed with *assimilella* better than with *trimaculella*. Dr. Martin Hering, of Berlin, to whom I submitted mines, suggested independently that they might be *assimilella*. This conjecture has now proved to be correct, three specimens of *assimilella* having been bred on April 4th, May 19th, and June 2nd, 1928, from the larvae on grey poplar. The occurrence of *N. assimilella* on *Populus tremula* in woods near Oxford has long been known to me, the empty mines being sometimes fairly common, though here again my efforts to breed the moths have been unsuccessful; but *Populus canescens* (regarded by some botanists

as a hybrid between *P. tremula* and *P. alba*, the latter being a rare tree round Oxford) is an unrecorded food-plant. There is no perceptible difference between the mines on *P. canescens* and those on *P. tremula*, except that the latter are more often affected by the leaf-nervures, being in many instances confined between two of the principal ribs. The mines from both aspen and grey poplar have all been obtained from young trees and low bushes, especially suckers with large leaves, in September and early October. The fact that no trace of mines has been found in the summer, and the reluctance with which the imago emerges when subjected to warmth, indicate that *assimilella* is single-brooded in this district.

NEPTICULA SP.? ON *SANGUISORBA OFFICINALIS*.

It is surprising that no species of *Nepticula* has yet been detected in Britain on the Greater Burnet (*Sanguisorba officinalis*), seeing that at least three species are known to feed on that plant on the Continent. On October 1st, 1924, I came across two empty *Nepticula* mines, one imperfect, in the leaflets of a plant of *Sanguisorba* growing on the edge of a field near Stanton St. John (Oxon). Subsequent searches in the same spot having failed to reveal any more mines, I conclude that these two were of accidental occurrence, and probably due to stray larvae of *N. centifoliella* Z., which is common on *Rosa canina* close by. The mines are long twisting galleries, with a central line of black excrement throughout, agreeing in all particulars with those of *centifoliella*. Entomologists in whose area *Sanguisorba* grows freely would nevertheless do well to watch the plant carefully for *Nepticula* mines.

NEPTICULAE ON *PYRUS AUCUPARIA*.

Of the three known British species on mountain-ash, *N. sorbi* Stt. is the most easily detected, its larva disfiguring the leaves with a large and conspicuous oval blotch, greenish at first, but turning brown when the larva has departed. It is worth pointing out that *sorbi* has a wide distribution in Wales and southern England. On June 22nd and 23rd, 1928, larvae were found in plenty in the woods of west Gloucestershire (Symond's Yat and Staunton); while I have noticed the empty blotches in Caernarvon (common near Penmaenmawr), Monmouth (Llanthony), Surrey (Hindhead), Sussex (Blackdown), and Hampshire (Waggoners Wells, near Bramshott, and Emery Down, near Lyndhurst). The

larvae must be collected fairly early in the summer, at least in the localities just mentioned, as by mid-July very few are still feeding. The other two species, *N. aucupariae* Fr. and *N. nylandriella* Tgst., both having green larvae which mine long galleries, appear more difficult to distinguish in their early stages. From a large batch of green larvae, collected in August, 1924, in woods near Penmaenmawr, only a single imago resulted, on May 4th, 1925; much to my surprise, this was a specimen of *nylandriella*, hitherto recorded only from Sutherland and Lancashire, and very little known in this country. A few green larvae, collected in the same district in early September, 1927, produced a single example of *aucupariae* on May 10th, 1928. On examining the mines from Penmaenmawr, I find them to vary greatly as regards the thickness of the frass-line; it is natural to suppose that those with a fine frass-line are mines of *nylandriella*, those with a thick frass-line mines of *aucupariae*. On consulting Mr. N. Grónlien, of Voss, Norway, to whom I am indebted for specimens of mines from his district, I found that he too regarded the mines with a fine frass-line as those of *nylandriella*. Confirmation is, however, desirable. Can any entomologist supply a reliable mine of *nylandriella*, preferably one from which the moth has actually been bred? As for *aucupariae*, it is a widely distributed species. I have it from Merioneth (Dolgelley) as well as Caernarvon, and have found larvae (forming mines with a broad excremental line) in Westmoreland (Ambleside), Oxfordshire (the University Parks, Oxford), Surrey (Hindhead), Sussex (Blackdown), and Hampshire (Waggoners Wells). In the University Parks a larva, undoubtedly of this species, was found on October 26th, 1923, in a leaf of *Cotoneaster frigida*.

N. SPLENDIDISSIMELLA H.-S.

It is not always easy to separate this species in its early stages from the common *N. aurella* Stt.; for though *aurella* is most partial to ordinary bramble (*Rubus fruticosus*), and *splendidissimella* to raspberry (*R. Idaeus*) and dewberry (*R. caesius*), each may be found on the food-plant of the other. In the second half of October, 1924, larvae were particularly plentiful at Cothill (Berks) on both raspberry and dewberry. Relying on Tutt's statement (British Lepidoptera, I, p. 244) that the egg of *splendidissimella* is laid on the under-surface of the leaf, I carefully sorted out the larvae according to the side on which the egg had been placed; but without avail, for both batches produced imagines of *splendi-*

dissimella. The length and narrowness of the mine of this species are certainly very striking. If straightened out, its total length often attains fully five inches, though restriction of space within the leaf sometimes compresses it into a dense tangle. Its breadth, even at the end of this distance, is hardly more than 1.5 mm., though it terminates in a small oblong blotch of about 2×5 mm. (surely not 7×5 , as Tutt states). The frass is normally deposited in a fine central blackish thread; but sometimes is more scattered, either forming a widened line in which the separate pellets can be distinguished, or spreading (when deposited in a semi-liquid state) into a smudgy line occupying half or more of the gallery. When the frass-line is broad, it is hardly possible to point out any absolute distinction between this mine and the mine of *aurella*. Once the larva has pupated, it is easy to distinguish *splendidissima* by the olive-green or brownish-olive colour of its cocoon.

N. AGRIMONIAE FR. (*AGRIMONIELLA* H-S.).

The only British locality recorded for this species is Abbot's Wood in Sussex, where it was discovered in 1879 by Mr. W. H. B. Fletcher (see Ent. Mo. Mag., XVIII, 1881-2, p. 211, and Tutt, Brit. Lep., I, p. 314). Does it still occur there? It is satisfactory to be able at last to add a second locality, namely Mickleham in Surrey. On September 30th, 1927, in the course of a brief visit to Mickleham Downs, I found larvae on some plants of *Agrimonia Eupatoria* growing with other herbage on a sheltered grassy bank. The mines of *agrimoniae* begin as narrow galleries with rather thick and irregular central lines of brown frass; later the galleries widen and merge into each other, becoming a broad brown blotch with numerous irregular frass-lines. Thus there is no possibility of confusing them with either the oval yellowish and rather clear blotches of *N. aeneofasciella* H.-S., or the long narrow galleries of *N. fragariella* Hein. (= *aurella* Stt. ?), occurring on the same plant. I therefore collected as many larvae as I could in the few moments available; fortunately they were not scarce, often several in a leaflet. There remained some uncertainty as to whether they might not be merely larvae of *N. arcuatella* H.-S. feeding on an unusual plant. *Arcuatella* was, in fact, common on wild strawberry in the same spot, and its larvae and mines are not readily distinguished from those of *agrimoniae*. All doubt disappeared, however, a fortnight or so later, when the *Agrimonia* larvae all pupated within the leaves. The British species of *Nepticula* which habitually pupate within the leaves are very few (*N. septembrella*

Stt., *N. weaveri* Stt., and perhaps *N. cryptella* Stt.), and include none of those closely related to *agrimoniae*. The leaves were kept out of doors all the winter, and produced nearly thirty handsome specimens of the moth between June 7th and 24th, 1928.

SOME PRACTICAL HINTS.

It may perhaps assist other Lepidopterists if I point out that *N. agrimoniae* and the group of species to which it is closely allied, all having black or blackish forewings with a silvery fascia and white-tipped cilia (*N. atricollis* Stt., *N. rubivora* Wlk., *N. angulifasciella* Stt. and *N. arcuatella* H.-S.), require careful treatment if they are to be successfully reared. For their pupation I find it advisable to line the tin in which the leaves containing larvae are placed with a bed of close damp moss, over which fine sand has been sprinkled. The cocoons should not be brought indoors, but should be left exposed to the cold all the winter, and prevented from going dry by occasionally adding a little more moss; they should be brought indoors only when the natural time for emergence is at hand. If brought into warmth early in the year along with the cocoons of other *Nepticulae*, they almost invariably fail, at most one or two moths emerging from a large batch; thus the cocoons of *arcuatella* produced by the Mickleham larvae on *Fragaria* mentioned above were brought indoors in February or early March, and not a single moth resulted from them. By observing the conditions mentioned, I have reared good series, not only of *agrimoniae*, but also of the other four species.

SUPPOSED DOUBLE BROODS.

Many *Nepticulae* reputed to be double-brooded have proved to be definitely single-brooded, so far as my experience goes. Thus *N. oxyacanthella* Stt., *N. basiguttella* Hein., *N. aucupariae* Fr., *N. tiliae* Fr., *N. continuella* Stt., *N. ulmivora* Fologne, and *N. prunetorum* Stt., all of which are still treated as double-brooded in the new edition of Meyrick's 'Handbook,' almost certainly have but one brood (habitually) in this country. The same may be said of *N. atricollis* Stt. and *N. arcuatella* H.-S., both regarded as double-brooded by Tutt, but belonging to a group of single-brooded species. For a number of seasons I have searched constantly for *Nepticulid* larvae, frequenting the same spots and examining repeatedly the same plants, and I feel certain that a summer brood of most of these species would have been detected, if it had occurred. Moreover, many of the records of double broods are based on the finding of larvae in the summer months, or of

empty mines in the autumn; whereas the mere occurrence of early larvae is not adequate evidence of a summer emergence of imagines. The imagines of single-brooded species are apt to emerge at various times between April and August; it is natural that their progeny should also vary in the date of its appearance. There is a very definite difference, in most instances, in the way in which the pupae respond to warmth, those of single-brooded species not producing the perfect insect with anything like the same readiness. I have bred *N. angulifasciella* Stt. and *N. woolhopiella* Stt. down to the end of June, *N. trimaculella* Hw. on July 24th (1924), and *N. ulmivora* Fologne as late as the beginning of September (1923), all from larvae collected the previous autumn, while *N. atricollis* Stt. has been captured in the open on July 2nd (1922), and *angulifasciella* is of normal occurrence throughout July. It must, of course, be remembered that a summer brood may occur in certain districts or certain seasons and not in others (see Tutt's remarks on *N. pomella* Vaugh. and *N. basiguttella* Hein.), or that some pupae of a brood may mature quickly and others remain over (see the remarks on *N. plagicolella* Stt. and *N. acetosae* Stt. in Ent. Mo. Mag., LX, 1924, p. 94), or again that the summer larvae may be few in number and hence overlooked, especially as it is more difficult to detect certain leaf-miners in the height of summer, when herbage is at its densest, than in the autumn. Nevertheless the only acceptable proof that a *Nepticula* is double-brooded is that larvae found in the summer should have produced moths under natural conditions the same season.

184 Woodstock Road, Oxford.

September 20th, 1928.

NEPTICULA ALBIFASCIELLA HEIN.: ITS EARLY STAGES AND
ITS OCCURRENCE IN BRITAIN.

BY E. G. R. WATERS, M.A., F.E.S.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiv.

In Vol. XV of the 'Berliner Entomologische Zeitschrift,' p. 222 (1871), Heinemann described under the name *albifasciella* a new species of *Nepticula*, on the strength of two females bred by himself from oak, and one specimen bred by Dr. Schleich. He distinguished it from *N. apicella* Stt. (= *argyropeza* Z.) by the brighter ferruginous colour of the head and the yellowish collar; from *N. subbimaculella* Hw. by the absence of a basal white spot and differences in the colour, position, etc. of the costal and dorsal spots. In Heinemann and Wocke's 'Schmetterlinge Deutschlands und der Schweiz,' vol. III, part 2, p. 769 (1876), the description was repeated in a condensed form; apparently no additional material was then available. In Snellen's 'Vlinders van Nederland,' vol. II, part 2, p. 1002 (1882), *albifasciella* was mentioned as an inhabitant of Holland, on the strength of two bred and two captured examples, all females, identified by Heinemann himself. Snellen pointed out further distinctions between *albifasciella* and *subbimaculella*, yet concluded by suggesting that the former might be merely a variety of the latter. Staudinger and Rebel, in their 'Catalog der Lepidopteren des palaearctischen Faunengebietes,' third edition, part II, p. 228 (1901), accepted this suggestion, and treated *albifasciella* as a variety of *subbimaculella*.

Hazardous though it may now appear to describe a new *Nepticula* on the basis of so few specimens and without an adequate knowledge of its early stages, *N. albifasciella* is a good species. The fact that it was bred from oak separates it conclusively from *N. argyropeza*, which is attached to aspen. The absence of any basal spot and the different shape and relative position of the costal and dorsal spots separate it clearly from *subbimaculella*. Herr W. Petersen, of Nõmme, Esthonia, who will shortly publish an important paper on the genitalia of the *Nepticulidae*, has kindly informed me that the genitalia of *albifasciella* distinguish it with certainty from *subbimaculella*. Its specific distinctness may now be confirmed by an account of its early stages, both the larva and the mine being found to differ consistently from *subbimaculella*. Fifteen specimens bred in April and May, 1928, from oak-feeding larvae which had been carefully isolated, show complete consistency in the markings of the imago, and agree so closely with the description of *albifasciella* that there need be no hesitation in identifying them with that species. It would have been more

satisfactory if they could have been compared with examples actually named by Heinemann; but the whereabouts of his specimens is unknown to me, and Mr. Meyrick (to whom I have submitted specimens) supports me in regarding the comparison as superfluous.

As *N. albifasciella* has not hitherto been recorded from Britain, a brief description of the imago, as well as of the earlier stages, is here appended.

IMAGO. *Antennae* $\frac{2}{5}$ to $\frac{1}{2}$, dark fuscous, pale beneath. *Head* rather long-haired, ferruginous-ochreous to dark ferruginous, sometimes darker on the crown; *antennal eyecaps* ochreous-white or ochreous. *Thorax* dark fuscous, rather shining. *Forewings* dark fuscous, rather coarsely scaled; a small irregular glossy whitish ochreous-tinged spot on costa, roughly triangular, the anterior angle prolonged towards base of costa, the posterior angle reaching $\frac{1}{2}$; a larger glossy whitish ochreous-tinged spot on dorsum at $\frac{1}{2}$, triangular with equal sides or broadest on dorsum, its apex pointing to just beyond the apex of the costal spot; sometimes the costal and dorsal spots unite to form a whitish fascia, outwardly oblique, with inner edge concave, outer edge faintly concave or straight; *cilia* beyond a dark dividing line white tinged with grey or ochreous, greyer on costa and tornus. *Expanse* 4.5-6 mm. *Hindwings* grey; *cilia* about 4, grey. *Underside* of fore- and hindwings shining grey. *Abdomen* shining dark fuscous, ♂ with ochreous or ferruginous anal tuft. *Legs* shining dark fuscous.

EGG a silvery globule, invariably placed against a nervure, usually the midrib, on the upper surface of an oak leaf.

LARVA 4-5 mm. long when full-grown; pale greenish-yellow, head and mouth-parts brown, prothorax with two longitudinal dark brown lines dorsally and a quadrangular blackish patch ventrally, dorsal vessel bright green; mining, with venter uppermost, in leaves of oak (*Quercus robur*). When the larva is about to pupate, the dorsal vessel becomes of the same colour as the rest of the body. *Mine* at first a fine gallery, usually running straight along a nervure, but sometimes wandering irregularly or taking a short cut to another nervure; after a distance varying from 7 to 14 mm., the larva turns back upon its course and excavates an irregular oval or rectangular blotch, based on a nervure, varying in length from 6 to 13 mm. and in breadth from 3 to 6 mm. *Frass* black; in the gallery forming a thick central line, in the blotch deposited in an irregular heap along the nervure which serves as base. The larva quits the leaf through a semi-circular slit in the upper cuticle, on that edge of the blotch which is farthest from the base. The blotch, when held against the light, is pale greenish-yellow, not transparent, with a brown patch where the frass lies; when the larva has departed, the whole blotch ultimately turns brown.

COCOON a flattened ovoid, 2-3 mm. long, about 1.5 mm. across, broadest at the end from which the imago emerges, the upper edge slightly flattened into a flange; compactly made, with a few projecting ends of silk; dark red or purplish-red, turning black under the influence of moisture; placed (in captivity) on a leaf or on tissue-paper. *Pupa-case* (when empty) light brown, hardly transparent; seldom projecting from the cocoon after the emergence of the imago.

The imago resembles *subbimaculella* in size and build, but is readily distinguished by the absence of a basal white spot. More-

over, in *subbimaculella* the costal and dorsal spots point in different directions and do not tend to form a fascia, the dorsal spot is erect, and its apex is some distance beyond the apex of the costal spot. Another difference, quite conspicuous if series of bred specimens are compared, lies in the colour of the pale markings; in *subbimaculella* they are plain white or creamy-white, in *albifasciella* regularly tinged with ochreous. The specimens of *albifasciella* originally described by Heinemann were evidently of the fasciated form; but the spots by no means always unite into a fascia. In a specimen before me, one of the forewings has the spots well separated, the other forewing a broad fascia. *Argyropeza*, which in several respects resembles *albifasciella*, has the pale markings much less distinct, while the costal spot is beyond the middle of the wing, and consequently the fascia is not oblique.

In spite of the very definite characteristics of the imago, *albifasciella* would probably have remained undetected in this country, had it not been for the distinct habits of the larva. A few years ago (see Ent. Mo. Mag., LX, 1924, p. 101) I drew attention to a peculiarity of the larva of *subbimaculella*, namely its habit of cutting out an acute-angled tongue of leaf-cuticle on the underside of the leaf, usually between the midrib and another nervure. In subsequent seasons I was puzzled by the fact that some of the *Nepticula* larvae in oak-leaves did not extend their blotches to the base of a nervure, or cut through the leaf-cuticle. In the autumn of 1926 some trees were noticed in Tubney Wood where the abnormal blotches were fairly plentiful, but empty of larvae. By keeping the locality in question under observation during the summer of 1927, I was able to obtain three larvae on August 25th and many on August 29th, and found them to differ considerably from the larva of *subbimaculella*, the dorsal vessel being green instead of reddish. From these larvae numerous cocoons were obtained, and the fifteen moths mentioned above were reared between March 23rd and April 29th, 1928. It is probable that the methods by which *albifasciella* was tracked down may be applicable to other species of *Nepticula* not yet distinguished. Among nearly 150 mines of *albifasciella* examined, only six have been found in which the blotch extends to the angle between the midrib and a nervure, and in no instance has the larva bitten through the under cuticle; the difference in habit may therefore be regarded as consistent.

One reason why *albifasciella* has hitherto been overlooked is doubtless the relatively early date at which the larvae feed. An

entomologist wishing to rear *subbimaculella* would naturally collect the larvae in late October or November, preferably when the leaves have fallen, hundreds being then obtainable under a single tree; whereas larvae of *albifasciella* are earlier, occurring chiefly in late August and September, and have almost all left their blotches by the time when *subbimaculella* begin to feed. Nevertheless the two species overlap to some extent; two larvae of *albifasciella* were found feeding on October 21st, 1928, although larvae of *subbimaculella* had already been noticed on October 14th. In any case the differences in the larvae and their blotches are so marked that no difficulty will be found in discriminating the two species.

N. albifasciella is probably a rather common species in Britain, though by no means so generally abundant as *subbimaculella*. During September and October, 1928, I have noticed its larvae or mines in many different localities; but though fairly plentiful in each locality on certain trees or branches (almost invariably the low overhanging branches of large oaks), they are absent from a great many others. In North Berkshire larvae have been found, not only in Tubney Wood, but also in Wytham Woods (September 30th and October 21st) and at Cothill (October 2nd), while empty mines have been seen in Bagley Wood (October 14th). In Hampshire *albifasciella* occurs in the New Forest (about two dozen larvae and many empty mines collected in the Whitley Woods by my wife and myself on September 25th) and at Waggoners Wells, near Bramshott (a larva found by my wife in a fallen leaf on October 7th. In Surrey, empty mines have been found at Mickleham (October 8th) and Chiddingfold (October 9th). In the British Museum examples of the imago have been detected, under the name *subbimaculella*, in the General (European) Collection, one obtained by Stainton in the sixties (labelled merely 'England'), others by Lord Walsingham (probably from Merton, Norfolk); also in the collections of Dr. J. H. Wood (several examples, probably from Herefordshire) and Mr. E. R. Bankes (a fine specimen from Bloxworth, Dorset, dated May 26th, 1893, and two poor specimens from Corfe, June 11th, 1890, and June 10th, 1891). The last-mentioned examples give us May and June as the natural time of flight of the imago in this country. On the Continent *albifasciella* is recorded from Brunswick (Heinemann), Stettin (do.), the Hague (Snellen), Breda and Helvoirt in North Brabant (do.).

184 Woodstock Road, Oxford.

October 23rd, 1928.

OCCURRENCE OF *CUCULLIA LACTUCAE* W. V. AT OXFORD.

BY JAMES J. WALKER. M.A., R.N., F.L.S.

In the collection of British Lepidoptera formed by the late Mr. Arthur Sidgwick, and presented to the Oxford University Museum by his widow in 1922, a *Cucullia* standing in the series of *C. umbratica* L. attracted my attention as something unusual, by its comparatively short and obtuse fore-wings and their glaucous-grey colour, with elusive shades of madder-brown. This moth was provisionally identified by me as a ♂ of *C. lactucae* W. V., a determination which was kindly confirmed at the Natural History Museum at South Kensington by Messrs. W. H. Tams and J. H. Durrant. The insect is labelled in the same style as all the other specimens in the collection, " $\frac{\text{Ox. 00}}{\text{vi. 3}}$ ", and the corresponding entry "Umbratica" in Mr. Sidgwick's diary of captures, etc., under that date, is underlined in a manner which Mr. N. V. Sidgwick, F.R.S., his nephew and constant collaborator in Entomology, assures me is intended to indicate that the moth was bred, as is also suggested by its perfect condition. Mr. Sidgwick was so careful and accurate an Entomologist, and so scrupulous in labelling his specimens, and in admitting none but authentic British insects to his collection, that there is no doubt in my own mind that this *Cucullia* was actually bred at Oxford. It is, however, somewhat difficult to understand how in this case the very brightly-coloured larva, which is even more conspicuous than those of *C. verbasci* and its allies, can have been confused with the dingy-looking caterpillar of *C. umbratica*, unless, as suggested by Professor Poulton, the insect was found in the pupa state. *C. lactucae* is widely distributed throughout the Palaearctic Region from France to Eastern Siberia, and its food-plants, lettuce and sowthistle (the flowers of which are preferred by the larva), are so abundant, that the occasional occurrence of this interesting species in our Islands is by no means beyond the bounds of probability.

The name of *C. lactucae* has indeed already appeared on the list of British Lepidoptera, in Stephens' "Illustrations," *Haustellata*, III. p. 89; but it is evident from his description of the insect and its larva, as well as those of *C. tanacetii*, W. V., and *C. lucifuga*, W. V., recorded with it, that all these are merely forms of *C. umbratica*. Cf. Hampson, *Cat. Lep. Phal.* vol. vi. p. 40.

Oxford.

December 15th, 1922.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiv.

Occurrence of Danaida plexippus L. in recent years at Oxford.—I am indebted to my friend Mr. A. H. Hamm, of the Oxford University Museum, for the following statement by a reliable observer respecting the recent appearance of this unmistakeable butterfly close to Oxford.

Anosia plexippus.—This butterfly is said to have been seen almost daily for about a fortnight during September of 1926 visiting Michaelmas daisies in the nursery garden of Mr. E. W. Gurden at the back of the reservoir on Headington Hill. Although not acquainted with the species, Mr. Gurden was able to identify it among a collection of coloured plates of the British butterflies, and declares that a figure of *A. plexippus* was identical with the one he saw. From Mr. Gurden's verbal description before he saw the plates I have no hesitation in saying that it was a specimen of the Milkweed Butterfly—L. DAWES, Headington.'

To this observation I am able to add two other occurrences of *Danaida plexippus* at Oxford in fairly recent years, the evidence for which I consider to be quite trustworthy, and have recorded them in 'The Natural History of the Oxford District' (British Association Handbook, 1926, p. 220). In 1908 the Rev. W. Mansell Merry, an experienced Lepidopterist, had a specimen of this butterfly, unfortunately too much damaged to be worth keeping, brought to him by his gardener, who had found it in a greenhouse in North Oxford and knocked it down with his cap. Two years later, in the autumn of 1910, another example was taken, also in North Oxford, on Michaelmas daisies, by a young lady, who passed it on to a Lepidopterist, Mr. Bryce M'Master. This gentleman, being well acquainted with the butterfly in Canada, naturally supposed this specimen to have been introduced by chance in its early stages, and it thus remained *perdu* in his collection until 1926, when, on learning of its great interest, he very generously presented it to me. It is a ♂ of the usual North American type, and if we accept the presumption that it has crossed the Atlantic unaided by human agency or assistance, it bears wonderfully slight evidences of its adventure, being in fine and quite unworn condition.—JAMES J. WALKER, Aorangi, Lonsdale Road, Summertown, Oxford: March 17th, 1928.

13

Meloe rugosus Marsh. near Oxford.—A ♂ example of this very rare 'oil-beetle' was found by Dr. J. W. Munro, of the Imperial College of Science, on a sandy path on the south face of Shotover Hill, October 16th, 1927. The specimen is now in the Oxford University Museum. Since the beetle was taken in small numbers some sixty years ago by Frederick Smith near Southend, the only records of its capture in Britain that I can find are those by the late Rev. Theodore Wood at Broadstairs (E.M.M., Vol. XXXIII, p. 259; XXXVIII, p. 286; XLIII, p. 42), and more recently by Dr. N. H. Joy at Streatley (Fowler and Donisthorpe, Col. Brit. Islands, VI, p. 300).—JAMES J. WALKER, Oxford: March 17th, 1928.

PTINUS SEXPUNCTATUS PANZ. BRED FROM THE CELLS OF THE
BEE *OSMIA RUFA* L., IN OXFORD.

BY A. H. HAMM, F.E.S.

In May 1919, I accidentally broke off a piece of a partially decayed post in the garden at the rear of my house in Southfield Road, Oxford, disclosing several mud cells of that common bee *Osmia rufa* L., which nidificates in such a variety of situations. Looking closely at the broken cells I was surprised to find nine small larvae which were unknown to me. The cells in which they were found being empty, the larvae were placed in a small glass-bottomed box without food of any kind, and were looked at from time to time. No changes were visible except that from May to December they continued to extrude faecal matter which had the colour and appearance of massed pollen grains. My friend Dr. Eltringham very kindly made a

microscopic examination of a small portion, and informed me that the deposit appeared to consist mainly of pollen-grains of several kinds with a considerable admixture of siliceous particles, probably derived from some sandy earth. He also recognised one particle of the débris as apparently insect remains of some kind. Thus there was clear evidence that they had eaten the pollen, etc., stored by the bee as food for her progeny. The siliceous particles present may have been derived from small portions of the wall of the mud cell which became mixed with the bees' food. Furthermore the larvae may have also devoured the grub of the bee.

Late in December, 1919, or early in January, 1920, eight of the nine larvae spun cocoons around the edge of the box.

The imagines of *Ptinus sexpunctatus* emerged in the following order :—

February 18, 1920,	- - 1 ♂	April 17, 1920,	- - 1 ♀
„ 23, „	- - 1 ♂	„ 20, „	- - 1 ♀
March 1, „	- - 1 ♀	May 3, „	- - 1 ♀
„ 5, „	- - 1 ♂	Oct. 30, „	- - 1 ♂

The last individual to emerge was still a larva in August, 1920. Inasmuch as the cocoon was spun partly on the glass of the box, without any silken covering on the glass itself, the enclosed larva could be plainly seen.

A single larva continued to move about the box, and finally spun a cocoon about June 6th, 1921, over two years from the time when it was found! Needless to say this lingerer was constantly watched, but as time went on and it did not appear, I finally broke open the cocoon on November 7th, 1921, and to my disappointment found the inmate dead.

That the breeding of this interesting beetle from the cells of *Osmia rufa* was not accidental has been abundantly confirmed by my breeding it again in numbers from the cells of the same bee under the following circumstances.

Last year (June 16th, 1922) a quantity of broken mud cells of *Osmia rufa*, taken from the lock of a garage in Restall's Yard, Hayfield Road, Oxford, was brought to the Hope Department, University Museum. Among the mass of broken cells a fair number of the larvae of the bee were found in various stages of growth, but none of these eventually reached maturity. It appears that they are unable to live long when lying loose among the fragments of their cells and food. Nevertheless the box was constantly examined on the chance of breeding parasites of some kind. Nothing emerged until November 1923, when the same species of beetle was again found in the box, and specimens have continued to emerge on the following dates :—

Nov. 5, 1923, - 2 ♂ 1 ♀	Nov. 13, 1923, - 4 ♂ 2 ♀	Nov. 23, 1923, - 1 ♂
„ 6, „ - 1 ♂ 1 ♀	„ 14, „ - 2 ♂ 1 ♀	„ 24, „ - 1 ♂
„ 7, „ - 2 ♂	„ 15, „ - 1 ♂ 1 ♀	Dec. 1, „ - 2 ♀
„ 8, „ - 2 ♂ 1 ♀	„ 16, „ - 2 ♂	„ 3, „ - 1 ♂
„ 9, „ - 1 ♂ 3 ♀	„ 19, „ - 1 ♂	„ 4, „ - 1 ♂
„ 10, „ - 2 ♂ 1 ♀	„ 21, „ - 1 ♂	„ 5, „ - 1 ♀
„ 12, „ - 2 ♂ 2 ♀	„ 22, „ - 1 ♂	

Canon Fowler in "The Coleoptera of the British Islands," vol. iv., p. 180, in his remarks upon the habitat of this beetle, says—"In old wood, occasionally found in houses; also said to have been taken in a humble-bee's nest in some numbers." It has also been taken by my friends Commander J. J. Walker and Mr. J. Collins in this district—by the former on an old wall tenanted by *Podalirius* (*Anthophora*) *pilipes* F. and probably *Osmia rufa*, also one specimen in the débris with which a nest of the black ant, *Lasius fuliginosus* Latr., was packed; and by the latter in some numbers floating in a rain-water butt in his garden. Mr. C. Morley, in this Magazine for May, 1919, records it from Gloucestershire, where it was supposed to have damaged the lead on a building. It was, however, in company with *Osmia rufa*, in the nest of which it had doubtless bred.

Considering the preferences of the *Osmia* for artificial holes of various kinds as a site for nidification, it is not surprising that the *Plinus* should be found in or near houses, as recorded by Fowler and others, and as I have myself taken it, especially if this bee should prove to be its usual host.

Both series of the beetles and other details connected with their life-history are now in the Hope Collection, at the University Museum, Oxford.*

22 Southfield Road, Oxford,
December 1923.

* Since the above was written 51 additional specimens have emerged, as follows:—Dec. 17th to 31st, 1923, 11 ♂ 2 ♀; Jan. 1st to Feb. 11th, 1924, 20 ♂ 18 ♀.—A.H.H

XXVII. *Some Coleopterous Remains from the Peat-bed at Wolvercote, Oxfordshire.* By K. G. BLAIR, B.Sc., F.E.S.

(Published by permission of the Trustees of the British Museum.)

[Read December 5th, 1923.]

A PRELIMINARY account of some of these fragments was given by Prof. Poulton at the meeting on 7th March last (*vide* Proc. Ent. Soc. London, 1923, pp. xv-xvii), but since that date further material has come to light which, together with more accurate determination of that previously examined, has made a more complete account now practicable.

The remains occurred in a peaty band about two inches thick which had been deposited at the bottom of a running stream, and are referred by Capt. K. S. Sandford to late Acheulean or possibly early Mousterian age, *i.e.* contemporary with Lower Palaeolithic man. The fragments have unfortunately been isolated from their matrix, some of them being unmounted, others mounted in dry cells or in Canada balsam. Except for one irregular piece of chitin that has so far defied recognition, all consist of elytra, many of them fairly complete.

As far as identified they represent the following species :—

1. *Notiophilus* cf. *aquaticus* L.* R. elytron. The colour is black without the metallic lustre of modern specimens, and the 3rd interstice is wider than the 4th; the whole is more or less wrinkled transversely, but this is probably due to the conditions of preservation.

The species has also been identified in the Dogger Bank deposits.

(Present habitat : Common and generally distributed.)

2. *Harpalus* cf. *dimidiatus* Rossi. L. elytron, portion, about the apical third and all the external portion outside the 7th interstice lacking. From modern specimens it differs in the basal carina being straight instead of feebly

* *I.e.* species "comparable with" *N. aquaticus* L. rather than positively identical with it.

arcuate, and in the sutural stria being free behind instead of uniting with the first complete stria. The microsculpture of the intervals though indistinct appears to be similar to that of the ♂.

This specimen is No. 2 of the set previously reported upon, and there assigned with some doubt to *Amara*.

(Chalky hillsides and salt marshes, under stones, etc. Apparently confined to the southern and south-eastern districts of England.)

3. *Synuchus* cf. *nivalis* Panz. R. elytron practically complete, L. elytron with apex wanting. Agrees well with modern specimens except that the scutellary stria unites with the first complete stria, leaving the anterior portion of the latter detached.

The left elytron is No. 3 of the earlier set, when it was provisionally assigned to *Amara*.

(Damp places; widely distributed.)

4. *Patrobis* sp. (?). R. elytron with the suture and apical half intact; but the whole of the base and humeral region wanting. Most nearly resembles *Patrobis assimilis*, Chaud. of existing species; striae rather indistinctly punctured towards the base, but smooth in posterior half; 3 and 4 apparently confluent behind, also 5 and 6; microsculpture on interstices indistinct, finely transversely reticulate.

This specimen is No. 4 of the earlier set, and was then provisionally assigned to *Amara*.

(Damp places; two of the three British species are boreal or mountain species.)

5. *Geodromicus* cf. *nigrita* Müll. Two elytra mounted in balsam on separate slides are of exactly the same size and dimensions and belong apparently to the same species; they are probably assignable to this species.

(By the side of lakes, streams, etc. Now only in the north of England, Scotland and Ireland.)

6. *Geodromicus* cf. *globulicollis* Mann. An elytron mounted on the same slide with one of the above is shorter and comparatively broader, evidently of a different species. It agrees well with modern specimens of this species.

(In moss; a highland and alpine species. Snowdon and Scotland.)

7. *Donacia* cf. *simplex* F. An elytron with both base and apex wanting exhibits sculpture very similar to that of *D. simplex*, but with even more regular transverse ridging

across the interstices. The colour is blackish-blue, not so bright as that of the blue form of the existing species.

This is No. 1 of the earlier series.

(Common and widely distributed in the neighbourhood of water.)

8. *Donacia* cf. *sericea* L. Three elytra, all R., mounted on the same slide seem to agree better with this than with any other existing British species. The colour is nearly black, with more or less dark blue reflections. A fourth elytron, L., is mounted on a separate slide.

(Like the last.)

9. *Otiorrhynchus* cf. *ligustici* L. No. 5 of the earlier series, at the time not satisfactorily determined, agrees very well with modern specimens of this species, a few of the opalescent scales, or parts of scales, remain still adherent to the surface. The fragment is a portion only of one elytron, with a part of the basal declivity to give its orientation.

(Heathy places; rare in England, but often injurious to crops on light land in France.)

10. *Trachyploeus* cf. *aristatus* Gyll. An elytron, L., mounted in balsam, is probably referable to this species. It is almost intact, though crumpled and split owing to the flattening of its highly convex form.

(Sandy and chalky places.)

11. *Notaris* (*Eriirrhinus*) cf. *aethiops* F. Four elytra mounted separately, but not all in an equally good state of preservation, are probably all of the same species, those in better condition agreeing well with modern specimens of *N. aethiops*.

(Marshy places, edges of drains, etc. Now only in the north of England, Scotland and Ireland.)

12. *Notaris* ? sp. The basal portion of an elytron, R., similar in size to the last and resembling them in many ways, is probably assignable to a different species. The punctures of the striae are large, very sharply cut, almost tuberculate laterally, but more sloping antero-posteriorly; interstices with small scattered pores, each eccentric to an indistinct darker circle (? tubercle). (Balsam mount.)

13. *Cureulionidae*, gen. ? L. elytron, $2\frac{3}{4}$ mm. by $1\frac{1}{2}$ mm., less convex and less declivous at apex than *Trachyploeus*; humeral callus well marked; 10 striae of large shallow punctures almost contiguous in the striae with intervals of about one diameter between the rows,

each puncture with a minute central (originally probably setigerous) tubercle. The punctures are rather indistinct, and the termination of the striae is not discernible (balsam mount).

14. *Curculionidae* (? *Baris* sp.). L. elytron. $3\frac{1}{2}$ mm. $\times 1\frac{1}{2}$ mm., convex, rather strongly declivous behind, with 9 deep perpendicular-sided striae with shallow, rather distant punctures that scarcely crenulate the interstices; sutural stria intact, not approaching scutellum, and extending to apex; 2nd to 4th, and 7th to 9th all ending separately a little before the apex, 5th and 6th confluent, and then produced, shorter; base indistinct, but first four striae appear to reach it, the 5th to 8th falling successively further short of doing so; 9th subhumeral, again longer; intervals shining, without evident microsculpture; humeral callus fairly distinct. The striae are distinctly Barid in character, but not the intervals; possibly not this sub-family at all.

15. An irregularly shaped piece of chitin, about 2 mm. square, black, coarsely and densely punctate, and somewhat rugose, with a tendency to the formation of pustules near one side. Probably from the ventral surface of some Coleopteron, but almost certainly specifically distinct from any of the above.

(No. 6 of the earlier set.)

The identification of these fragments with species still extant is in some cases open to doubt. In many cases even existing species are separable only on the comparison of parts not represented in our fragments, and the most we can claim is that on comparison of our fragments with the corresponding portions of existing species the resemblance is sufficiently close to warrant our provisional assumption of identity on the evidence to hand. We can at least say that our fragment more closely resembles the existing species than do any of its present-day relatives. Exactly what amount of alteration, if any, the facies of the species has undergone during the lapse of time involved it is impossible to say, since many of the points of difference noted, *e.g.* the course of the scutellar stria, are subject to considerable individual variation. There is one point, however, that is suggestive; the genus most abundantly represented in peat deposits from various localities and of various ages is *Donacia*, of which fragments of several different species have been found, *e.g.* *sericea*, *simplex*,

obscura, etc. All the elytra from peat that have come under my notice have been blue, a colour that is still fairly common in *sericea*, less so in *simplex*, and apparently very rare or unknown in *obscura*. The suggestion is that blue is a primitive colour in this genus, and that the variety of colours we now find is a comparatively modern evolutionary development.

Of the fifteen species represented at least ten are practically identified with existing British species, while the probability is that the remainder will also prove to be so when fully determined.

Of those of which at present we can say anything of the probable habits eight, *Notiophilus*, *Synuchus*, *Patrobis*, *Geodromicus* (2), *Donacia* (2), and *Notaris*, are partial to the waterside or wet places (but are not essentially fenland species); while three, *Harpalus*, *Otiorrhynchus* and *Trachyphloeus*, prefer sandy or chalky districts; though many of them are now local, six, *Notiophilus*, *Synuchus*, *Donacia* (2), *Otiorrhynchus* and *Trachyphloeus*, are still of wide distribution in Great Britain, while three, *Geodromicus* (2) and *Notaris*, no longer exist in the south. One, on the other hand, *Harpalus*, is now only found in the south-eastern counties. From this we can conclude that the climatic conditions at the time these insects were alive were not greatly different from those of the present day, though the proportion of what are now boreal species suggests that on the whole it was somewhat colder and more subarctic in character. The presence of the *Harpalus* is a little contradictory, but may be explained by supposing that the range of the species has since become more restricted.

The condition of the specimens is firm, though usually more or less crumpled. In some cases, and probably the same remark applies to all, it can readily be seen that only the harder more strongly chitinated upper membrane of the elytron has been preserved, the softer internal substance and probably the lower membrane having disappeared. Thus the specimens of *Donacia* and *Otiorrhynchus* exhibit a dull underside with the punctures projecting as a series of pegs. The dull surface, however, appears to show traces of a minute reticulation which may represent the lower membrane closely adpressed on to the upper, owing to the compression or loss of the softer internal substance.

Compared with the beetle remains from other peat

deposits examined, notably those of the Dogger Bank in the North Sea, and of Ireland, we find only one genus, *Donacia*, common to all, though *Geodromicus* has been identified from the Irish peat and *Notiophilus* in the North Sea "Moorlog." It must be borne in mind that the present series of fragments was from a small local deposit that stratigraphical evidence shows to have been laid down in the bottom of a running stream, so that we should not expect to find the same fauna as from an extensive area of fenland.

Another point on which comparison is interesting is the fact that in this series all the fragments but one consist of elytra, whereas in the others there is a considerable proportion, even preponderance, of heads, limb-joints, and portions of the body sclerites. This is presumably to be accounted for by the supposition that in this case the elytra were considered to be the only parts offering any chance of recognition, and hence the only parts worthy of preservation.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxii.

Captures of Tachinidae in the Oxford district during 1925.—For several years I have given some attention to the Dipterous family Tachinidae. Like every student of a fresh group, I have met with the usual difficulties with regard to names, and many of my problems have been kindly solved by Mr. J. E. Collin and Mr. C. J. Wainwright during the past year. The list of my 1925 captures given below has been worked out without any outside help with one or two exceptions, which were taken for the first time this year. I am sure no one will be more gratified than the Dipterists mentioned that their time spent in naming my early material has not been altogether wasted.

The following species have been met with by me in the neighbourhood of Oxford:—*Paraphorocera* (*Ceromasia*) *senilis* Mg., Tubney, August 1923, three specimens; *Lydella* (*Dexodes*) *stabulans* Mg., Yarnton and Water Eaton, Oxon, Tubney and Cothill, Berks., a common species; *Nemorilla* (*Exorista*) *notabilis* Mg., Yarnton, July 1925, one only; *Megalochaeta* *ambulans* Mg., Tubney, several in August 1925; *Phorocera* *cilipeda* Rnd., of general occurrence on flowers of *Pastinaca sativa* in the Oxford district in July and August, at Water Eaton and Yarnton, Oxon, and Tubney, Berks.; *P. caesifrons* Mcq., Hitch Copse, Besselsleigh, Berks., by sweeping in June, six specimens, and at Wood Eaton rather commonly; *Phryxe* (*Blepharidea*) *vulgaris* Fall., of general occurrence throughout Oxford district, parasitic on various forms of Lepidopterous larvae; *Blepharidopsis nemea* Mg., sparingly at Tubney, Kirtlington, etc., I have seen a series bred from *Phlogophora meticulosa* larvae; a close ally of *P. vulgaris*; *Compsilura* (*Phorocera*) *concinata* Mg.=*P. serriventris* Rnd. (Verrall's list), Tubney and Yarnton, August 1925, not uncommon, another species parasitic on Lepidoptera; *Chaetotachina rustica* Mg., a common species

at Oxford, also a Lepidopterous parasite, specially common at Yarnton in August last; *Epicampocera succincta* Mg., on parsnip flowers, quite common, I saw at least a score in August 1925, Wood Eaton, Yarnton, Kirtlington and Tubney, it superficially resembles a 'Blue-bottle'; *Macquartia praeifica* Mg. = *spinicincta* Meade, Yarnton, August 1925, two specimens, rather rare. First taken in 1912, two specimens, then in August 1924, at Stanton St. John, Oxon, six specimens in all; *Macquartia grisea* Fln., Hitch Copse, Tubney and Yarnton, four examples; *Degeeria ornata* Mg., Yarnton, August 1925, on parsnip flowers, five specimens taken also in 1923 and 1924 at the same place; ? *Degeeria* (*Discochaeta*) *muscaria* Fln., Tubney, July 1925, a series beaten out of bracken, in this and former years. I suspect it to be parasitic on the Homopteron *Stiroma pteridis* Boh. This fly was first taken at Tubney by the late G. H. Verrall, but recorded by him in error from Tangham Wood, Suffolk (*teste* J. E. Collin in litt.), under the name of *Vibrissina turrata* Mg. (E.M.M. 1912, p. 191). Mr. C. J. Wainwright, who has studied a series of the Tubney fly captured in 1924, and has supplied the name as above, has no evidence that *V. turrata* can be regarded as a British insect. (The generic position is somewhat uncertain.—C.J.W.). *Anaethetopsis ocypterina* Ztt., Yarnton, sometimes common, also at Tubney; *Eriothrix rufomaculata* DeG. (= *Olivieria lateralis* F.), common, but not as abundant as in August 1924, when it swarmed on parsnip flowers even by the road-sides; *Pelatachina tibialis* Fln., one example beaten from a poplar at Wood Eaton, June 1925; *Ernestia* (*Erigone*) *radicum* F., Besselsleigh and Tubney, on flowers of *Angelica* in and near woods, August 1925; *Thelymorpha marmorata* F., Yarnton, Oxon, August 1925, only one; *Voria* (*Plagia*) *ruralis* Fln., Yarnton, August 1925, three examples; *Wagneria* (*Phorichaeta*) *lentis* Mg. = *tricincta* Rnd., Tubney, May 1925, where I have taken it twice previously, and once at Wytham; *Bucentes* (*Siphona*) *geniculata* DeG., common everywhere around Oxford; *B. cristata* F., much less frequent. The genus is easily recognised by the geniculate proboscis, but the species are closely related, and are readily separated by the presence or absence of certain bristles on the abdomen; *Ptilocerina* (*Rhinophora*) *melania* Mg. ? = *atramentaria* Mg., not uncommon at Yarnton, June and August, evidently double-brooded. I have also taken one at Tubney. Mr. Wainwright is of opinion that the Yarnton *Ptilocerina* is *melania*, 'that *atramentaria* is a larger insect with more white tomentum on the abdomen, and it is not a shining black insect like *melania*'; *Loewia* (*Fortisia*) *petiolata* R-D., near Besselsleigh, Berks., August 1925, one specimen; *Rhinophora* (*Clista*) *lepida* Mg., common at Tubney, Yarnton, and elsewhere; *Melanophora roralis* L., one in a spider's web on an oak tree at Water Eaton, Oxon, June 1925. *Alophora pusilla* Mg. occurs in widely separated localities in Oxford district. *Brachycoma devia* Fln.; this viviparous fly, when captured, immediately extrudes clusters of minute larvae, which rapidly disperse across the hand when held between the fingers. A ♀ specimen taken in 1924 behaved in the same way (cf. E.M.M. 1924, p. 262); *Phyto melanocephala* Mg., Tubney, August 1926, common at the same locality in August 1924, the ♀ is more shining black than the ♂, which is greyer in tint (the ♀ = *P. nigra* Dsv., *teste* C. J. Wainwright); *Onesia agilis* Mg., generally common throughout the Oxford district and varies considerably in size, specially abundant on flowers at Cothill, August 1925; *O. gentilis* Mg. also common, Yarnton and Tubney; *O. cognata* Mg., less frequent at Yarnton, Tubney and Water Eaton, a close ally of *O. gentilis*.

The species of *Sarcophaga* are generally recognised as difficult to determine, dissection of the ♂ organs being necessary to name some of them. Knowing this I prepared my material and submitted it in February 1925 to Mr.

Wainwright, who named and made me types of sixteen species. This year I took twelve species of *Sarcophaga* and recognise them as under :—

Sarcophaga caruaria L. and *S. vicina* Villen are large and very similar species, but the ♂ organs are quite distinct, both are common; *S. striata* Mg., Yarnton, common; *S. melanura* Mg.; *S. nigriventris* Mg.; *S. crassimargo* Rnd.; *S. frenata* Pand., I took five ♂♂ at Yarnton, the red segment of the exposed aedeagus showing conspicuously when they are feeding on the flowers; *S. haemorrhoea* Mg., Yarnton, August 1925, one specimen, one taken also in August, 1924; inseparable in the field from *S. frenata*, but quite distinct from that insect; *S. setipennis* Rnd., Yarnton, August 1925, several in 1924; *S. dissimilis* Mg., a common species in the Oxford district; *S. sinuata* Mg., two ♂♂ and one ♀ from Yarnton, August 1925, first taken at Water Eaton, Oxon, July 1924: a rarity in the district; *S. offuscata* Schin., Cothill, August 1925, taken more frequently in 1924. Seven of the species without comment are generally common at Oxford; *Nyctia halterata* Pz., fairly common, but not observed in numbers this year as in some seasons, occurs throughout Oxford district; *Engyops micronyx* Br. and Brg.: this has only been taken at Yarnton: not common, four specimens in August 1925.

Yarnton, mentioned so much in my paper, is three miles N.W. of Oxford, and being conveniently accessible I often collect there in the summer evenings.

Miltogramma punctatum Mg., Tubney, scarce this year; a parasite of Aculeate Hymenoptera, sometimes common, when it may be seen following, resting near, or entering the burrows of *Colletes*.

Other Tachinidae taken at Oxford in previous years named by Mr. Collin, Mr. Wainwright and myself include such interesting species as *Meigenia floralis* Mg., Yarnton and Tubney; *Meigenia bisignata* Mg., Tubney, one; *Lydella nigripes*, Tubney 1924, two; *Gymnochaeta viridis* Fln., May 1924, on sloe blossom, Tubney; *Phryxo (Exorista) vetula* Mg., Wood Eaton, June 1923, one; *Megalochaeta (Epicampocera) conspersa=ambulaus* Mg., Waterperry Wood, near Stanton St. John, Oxon., May 1923, one; *Ceromastia sordidisquama*, Wood Eaton, Waterperry Wood, Tubney, etc.; *Gonia divisa* Mg., Tubney, 1914; *Gonia ornata* Mg., Tubney, 1919; *Monochaeta leucophaea* Mg., Wood Eaton, May 1923; *Lypha (Aporomyia) dubia* Fln., Tubney, Wytham and Wood Eaton, May 1923, common on tree trunks, Tubney, May 1923; *Lydia (Somolia) aenea* Mg., Stanton St. John, not common; occurs on the Chilterns and Berkshire Downs; *Macquartia chalconota* Mg., Wytham and Woodstock, 1914. I bred a series from larvae of *Chrysomela variaus* found here, and in June 1924 I bred more parasites than beetles from larvae of the same insect found at Yanworth, Gloucestershire; *Minella (Ptilops) chalybeata* Mg., Tubney, 1922; Hell Copse, Stanton St. John, 1921; Yarnton, 1924; widely distributed, but rare; *Miobia iuanis* Fln., Tubney, 1924, only once seen. I have also had it from the Berkshire Downs; *Panzeria (Erigone) minor* Vill., Wood Eaton, 1924, one specimen; *Panzeria rudis* Fln., Hell Copse, 1920, one specimen; *Paraplecta (Plagia) trepida* Mg., Yarnton, 1924, two examples; *Wagneria latifrons* Zett., Wytham, June 1914; Cothill, May 1914, ♂ and ♀ (teste C. J. Wainwright, who had previously seen one other British specimen); *Rhacodineura (Roeselia) antiqua* Fln., Tubney, Yarnton, etc.; *Actia (Thryptocera) pilipennis* Mg., Waterperry Wood, one by sweeping; *Digonochaeta setipennis* Fln., Wood Eaton, Sunnymede and Tubney, about five specimens; *Bucentes (Siphona) cristata* F., Wytham, 1914, Oxford, 1925; *Trixa oestroidea* Dsv., Tubney, Wytham and Yarnton, not common; *Loewia (Fortisia) intermedia* Br. and Brg., Yarnton, August 1924, one specimen, teste C.J.W. who had previously seen specimens from Nottingham; *Presina (Stevenia) maculata* Fln., Yarnton, August 1924,

another seen at Tubney settling on a flower, but missed, in the same month; *Onesia aculeata*, Wytham, Berks., August 1914, one; *Sarcophaga clathrata* Mg., Waterperry Wood, May 1920, one; *S. filea* Rond., Yarnton, August 1922, one; *S. haematodes* Mg., Tubney, August 1924, one; *S. pumila* Mg., Yarnton, June 1924, several; *Miltogramma germari*, Tubney, August 1905, rare; at the time I thought the insect was the much more common *M. punctatum*, until I met with the latter species, when I saw it was different, and sent it to Mr. Collin, who, on July 13th, 1924, took a specimen of *M. germari* at Tubney; *Ptychoneura (Metapodia) cylindrica* Fln., Tubney, July 13th, 1924, one specimen (named by Mr. Wainwright); *Metopia leucocephala* Rossi, Tubney, at and near burrows of Aculeate Hymenoptera, sometimes common; *Sphixapata conica* Fln., Tubney, same habits as the preceding; *Prosenia sybarita* F., Tubney and Cothill, 1920, 1921; *Dexia rustica* F., Tubney, 1924, not common; *Dinera grisescens* Fln., Wytham, 1914, two specimens.

This does not by any means exhaust the records of Tachinidae from the Oxford district; my friend Mr. A. H. Hamm, I have not the least doubt, could add considerably to this list. It is his ambition, I know, to publish a complete list of the Diptera of the Oxford district, and I have been able to supply him with many interesting captures in other families of the Order for this purpose.—
J. COLLINS, 74 Islip Road, Sunnymeade, Oxford: December 1925.

NEW SPECIES OF *LIMOSINA* (DIPTERA) ALLIED TO
L. CRASSIMANA HAL.

BY O. W. RICHARDS, M.A., F.E.S.

PLATE II.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiii.

In the recent monograph of the European species of the genus *Limosina* (O. Duda, 'Revision der Europaeischen Arten der Gattung *Limosina* Macq.' in Abh. K.K. zool.-bot. Ges. Wien, 1918) only two species are described as having the broad front tarsi and thickened, apically excised, front tibiae of *L. crassimana* (male). The second form is *L. clunipes* Mg. (apparently non-British), which Duda on pages 170-172 of his monograph treats as a variety of *L. crassimana*, distinguished by its extensively yellow face and crown. Previous attempts to split up the variable *L. crassimana* (e.g. Dahl, 'Die Gattung *Limosina* und biokoenotische Forschung,' in Sitzungsberichte Ges. Naturforsch. Freunde Berlin, 6, 1909, pp. 360-377) have proved unsuccessful.

Recently I have made a study of this group of the genus, using as my material partly my own collection, partly those of Messrs. A. H. Hamm and J. Collins, of the Oxford University Museum. The majority of the specimens here included have the exact habitat recorded in which they were captured, so that it has been possible to correlate a number of small morphological distinctions with

differences in habitat preference, and to distinguish what appear to be four species.

KEY TO THE SPECIES.

- 1 (2). The first joint of the mid tarsi not longer than the second; the former joint with a conspicuous posteroventral row of bristles (fig. 6). Wings fully developed in both sexes. Eyes of medium size. Arista relatively short, with hairs of medium length. Male with the lower pair of long bristles on each side of the anus not much shorter than the upper pair. Male front tibiae not so thick as in the other species. Female anal valve (fig. 2). *crassimana* Hal.
- 2 (1). The first joint of the mid tarsi longer than the second; the former joint with an inconspicuous row of posteroventral bristles. Arista longer. Male with the lower pair of long bristles on each side of the anus distinctly shorter than the upper pair. (Less so in *manicata*.)
- 3 (4). First joint of the mid tarsi longer (fig. 5). Eyes distinctly small. Arista very long with short hairs. Male with a patch of dense short bristles in the centre of the last visible sternite. Female with the hairs of the anal valve as in *crassimana* (fig. 2). *talparum* n. sp.
- 4 (3). First joint of the mid tarsi shorter. Eyes larger. Arista with much longer hairs. Wings usually darkened. Male with the bristles of the last visible sternite not denser in the centre.
- 5 (6). *Male* :—Wings (as in the preceding species) fully developed, with the fifth longitudinal vein projecting beyond the second cross vein or at least forming an angle with it. Eyes smaller. Arista rather longer on the average but with shorter hairs. *Female* :—The upper of the two long hairs at the apex of the anal valve short, unlike the lower one (fig. 1). *palmata* n. sp.
- 6 (5). *Male* :—Wings more or less shortened (fig. 4), with the second longitudinal vein straight and the angle between the fifth longitudinal vein and the second cross vein rounded. Eyes larger. Arista rather shorter on the average with longer hairs. *Female* :—The hairs on the anal valve as in fig. 2. *manicata* (Collin MS.) n. sp.

DESCRIPTIONS OF THE SPECIES.

The characters in which the species differ from one another are the only ones here mentioned.

L. crassimana Hal.

The front of the crown is often conspicuously reddish, especially in the male. The front coxae are usually dark like the surrounding parts. Halteres unicolorous. Mid tibiae nearly always without a small bristle between the two large anterodorsal subapical ones. The more basal of these large bristles preceded by one or two small ones. The arista is usually short, with hairs of medium length; varieties, however, occur in which the arista is somewhat longer and has longer hairs, but these forms seem to be rare. Another form of which there are two females in Mr. Hamm's collection (Oxford University Museum, Dec. 2, 1924) has the arista rather thick but not long, and with very long hairs; the hairs towards the apex of the wing are also rather longer than usual.

This is by far the commonest fly of the group. It occurs plentifully in open fields in horse-dung (apparently not in cow-dung). It is also often abundant on windows of houses; probably ninety-nine per cent. of the *Limosina* of this group found indoors

are of this species. It is less often found in woodlands than the others. I have examined seventy-five females and fifty-five males. It is common all round Oxford, and probably in most parts of England and Western Europe.

L. palmata, n. sp.

The crown rarely has much red in front, and then only in the male. The front coxae are usually dark like the surrounding parts. Halteres usually with the club conspicuously darker than the stalk. Mid tibiae usually (especially in the female) with a small bristle between the two large anterodorsal subapical ones. The more basal of these large bristles preceded by one or often two small bristles. Wings rather darker than in *crassimana*. The arista is rather variable. It is nearly always distinctly longer and with shorter hairs than in *crassimana*. Although it is usually shorter and shorter-haired than in *manicata*, yet some varieties nearly approach the species in this respect. The average size of *palmata* is distinctly larger than *crassimana*.

I have seen fourteen females and twenty males of this species. It appears never to be found in horse-dung, but to be mainly a woodland species. Only a very few specimens have been taken indoors. It is sometimes found in surface mouse-runs in woods, but this is probably not significant, since such runs are often very extensive and would be difficult to avoid. It has occurred fairly commonly round Oxford, both in Oxfordshire and Berks. At Oxshott, in Surrey, it was found in a pine-wood in an old nest of *Vespa vulgaris* L. and also in decaying fungi.

L. manicata (Collin), n. sp.

The first specimens I saw of this species had been given this name by Mr. J. E. Collin.

The front of the crown has a little red in the male, less in the female. The front coxae are usually markedly paler than the surrounding parts. Halteres with the club usually darker than the stalk, the exceptions being mainly females. Mid tibiae usually with no small bristles between the two large anterodorsal subapical ones. If this small bristle is present then the more basal anterodorsal subapical bristle and the subbasal one are each preceded by two small bristles instead of one. The posterodorsal subapical bristle is rather nearer the apex than in *crassimana*. The male front tibia is on the average thicker than in any other of the group. The wings are usually more or less reduced, especially in the males, sometimes almost normal in the female (fig. 3). In correlation with the reduction of the wings are:—The approximation of the two cross veins, the straightening of the second longitudinal vein, and the reduction of the alula. Most specimens, irrespective of wing-dimensions, have the wings darker than usual, often very dark, and the angle between the fifth longitudinal vein and the second cross vein rounded off. This latter character is only absent in a few of the females. The arista is long, rather thick at its base, and on the average longer haired than in any other species. In size this species is about the same as *crassimana* but the males are often very small.

This species is almost restricted to the runs and nests of the mice of the genera *Apodemus* and *Evotomys*, i.e. the mice which make surface-runs in woods. In this habitat it seems to be common

all round Oxford, both in Oxon and Berks. I have not yet seen specimens from elsewhere. From Oxford I have examined twenty-nine females and twenty-four males.

L. talparum, n. sp.

Front of the crown with some red in the male, little or none in the female. Front coxae pale in the male, darker in the female. Halteres unicolorous darker in the female. Mid tibia with no small bristles between the large anterodorsal subapical ones. Usually the more basal of these two large bristles not preceded by a small one. Legs often rather paler than usual. Wings nearly always quite hyaline (i.e. paler in colour than usual); the fifth longitudinal vein usually projects rather strongly beyond the second cross vein, especially in the female. Arista long and short-haired, apparently invariable in structure. *Talparum* seems to be always rather larger than *crassimana* (about as big as *palmata*).

This species is apparently restricted to the runs and nests of moles and of voles of the genus *Microtus*, i.e. of species which make subterranean runs in the open fields. I have examined twenty females and nineteen males; all the specimens from moles' nests were obtained by Mr. A. H. Hamm, who has found them commonly in this situation in Oxfordshire. I have found them in the nests and runs of *Microtus* near Oxford (Berks) and at Besse-en-Chandresse, Puy de Dome, France. The only specimens taken outside the usual habitat were one found on the window of the museum at Oxford by Mr. Hamm and one found by myself in the runs of *Eutamias* in Bagley Wood, Berks.

Except in the case of *L. talparum*, at least one pair, in cop., has been seen in each species.

In conclusion, my thanks are due to Messrs. A. H. Hamm and J. Collins, who allowed me to examine their collections; to Mr. C. S. Elton, who gave me all the *Limosina*s he found in the course of his investigation of the biology of mice; and to Mr. J. E. Collin for much helpful criticism and advice in the study of this genus, and for pointing out some of the most important differences in these species.

The types of all the new species have been deposited in the Hope Department of the Oxford University Museum.

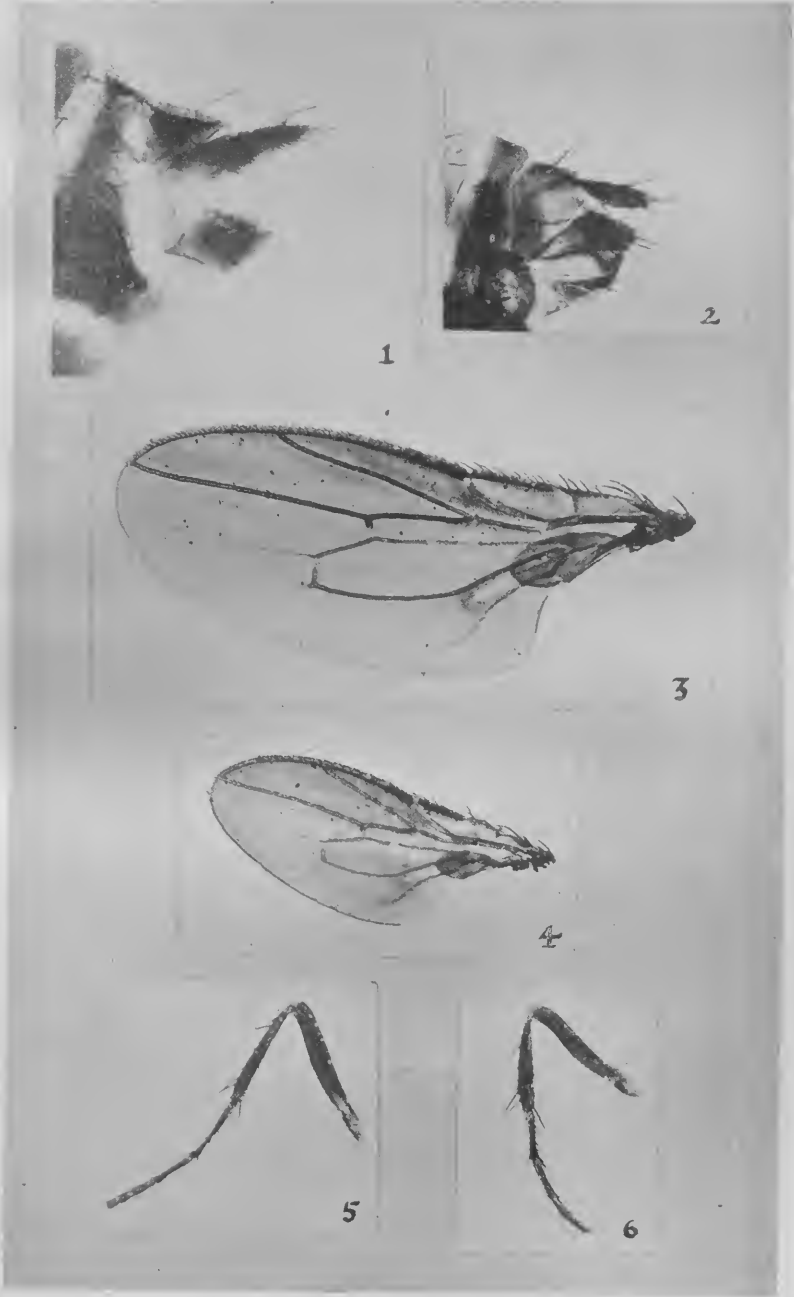
EXPLANATION OF PLATE II.

Fig. 1. Tip of the abdomen of *L. palmata* from the left side showing the bristles at the end of the abdomen (female) ($\times 160$). 2. The same of *L. crassimana* female. 3. Nearly normal wing of *L. manicata* female; differs from *crassimana*, etc., only in being very dark ($\times 36$). 4. The same of a short winged male of *L. manicata*. 5. Mid leg of *L. talparum* female ($\times 27$). 6. Mid leg of *L. crassimana* ($\times 27$).

70 Belsize Park Gardens,

London, N.W.3.

December 1926.



NEW SPECIES OF LIMOSINA.

W. Chesterman, photo.]

Obituary.

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxiv.

Francis Cardew Woodforde, B.A., F.E.S., died on July 17th, after a long period of failing health, at Headington, Oxon. The Rev. James Woodforde, whose 'Diary of a Country Parson,' with its quaint and minute details of the social life of more than a century ago, was received with so much interest on its publication in 1926, was his great-uncle; and his father, Dr. F. H. Woodforde, of Taunton, Somerset, was in his day a well-known naturalist, who formed a very fine collection of the birds of the county, which included many rare species, and was presented to the Oxford University Museum by the subject of this memoir. Woodforde was born at Taunton on November 13th, 1846, and educated at the College in his native town; at the age of eighteen he won a demyship at Magdalen College, Oxford. This he very generously gave up in favour of a man in less affluent circumstances than himself, and proceeded to Exeter College, taking his degree in Natural Science in 1868. Disappointed in his wish to adopt the profession of medicine, he devoted himself to teaching, and in 1882 he became Head Master of the old Grammar School at Market Drayton, Staffs., and retained this post until his resignation in 1909: though during the Great War his strong patriotic feeling led him to resume his school-work in order to liberate a younger man for service.

From an early age he displayed a keen interest in all branches of Natural History, and for many years he was well known as one of the most energetic and successful collectors of Lepidoptera in the Midland counties. Very few if any entomologists had so intimate an acquaintance with the rich insect fauna

of the Burnt Woods, Chartley Moss, Wyre Forest, Cannock Chase, and other localities within easy reach of Market Drayton, and in his vacations he went farther afield to North Wales, Cornwall, the New Forest and Scotland. He thus formed, with the aid of his numerous friends and correspondents, one of the finest and most complete collections of British Lepidoptera of the period, which was disposed of by him at Stevens's a year or two before he finally left Market Drayton.

Woodforde made Oxford his headquarters in 1910, and at the instance of Prof. E. B. Poulton he undertook the onerous and highly desirable task of putting into order the great collection of British Lepidoptera in the University Museum in accordance with modern ideas of arrangement and labelling, as well as dealing with a very large number of specimens from various sources which awaited incorporation into the general series. Up to within a year of his death he devoted practically the whole of his time to this work, except during the summer months, when he made prolonged and successful visits to some of his old hunting-grounds, the valuable results of these trips being handed over to the Museum. It was during one of these visits to North Cornwall in 1911 that he found the then very rare diurnal cockchafer *Rhizotrogus ochraceus* flying in abundance, and was able to supply many of our collections of Coleoptera with this desideratum. Also in 1921 and the following year he spent the summer with a married daughter at Passavant, an almost unworked locality in Eastern France; the very interesting results of these two visits are detailed in our Magazine for 1923 (Vol. LIX, pp. 61-64).

Before his last illness he had completed the arrangement of the British Lepidoptera in the University Museum to the end of the Crambites, several important collections having been acquired by bequest or otherwise and incorporated while the work was in progress. The net result is a series of our native butterflies and moths which for extent, completeness, and above all for the copious and accurate data attached to nearly every individual insect, is probably unrivalled at the present time. The richness of this great collection is well shown in the comprehensive account from Woodforde's pen in the pages of the 'Entomologist,' Vols. LIV, LV, and Vol. LVIII, pp. 177-180; at the date of the latter article (August 1925) the number of arranged specimens amounted to no fewer than 42,000. The disinterested labours of the subject of this notice will not fail to be appreciated by every Entomologist who may have occasion in the future to consult the University Museum collections.

In his younger days Woodforde was an excellent shot with the rifle, and a keen Volunteer, holding the rank of Captain in two corps in succession. Next to Entomology, his chief delight was in fly-fishing, and he also took much interest in the geology of Staffordshire. One of the kindest and most generous of collectors, he was ever ready with information or specimens for his fellow-workers, and his varied knowledge and quiet humour made him a most pleasant colleague. In later life he was much handicapped by progressive deafness, and for some months previous to his decease he was partially paralysed and bedridden. The end came very peacefully, and he was followed to his last resting-place at Headington Cemetery by the Hope Professor of Zoology and the writer of this notice.

He married a distant cousin in 1874, and we are greatly indebted to one of his surviving daughters, Mrs. P. M. Scott, of Sherborne St. John, Basingstoke, for valuable assistance in the preparation of this memoir.—J.J.W.

THE ENTOMOLOGIST.

VOL. LVIII.]

AUGUST, 1925.

[No. 747

SOME NOTES ON THE COLLECTION OF BRITISH MACRO-
LEPIDOPTERA IN THE HOPE DEPARTMENT OF
THE OXFORD UNIVERSITY MUSEUM.

BY F. C. WOODFORDE, B.A., F.E.S.

(Concluded from vol. lv, p. 14.)

DURING the interval which has elapsed since my last notes great additions have been made to the Collection, which now numbers about 42,000 specimens. Three entire collections have been presented by the widows of the collectors, viz. that of the Rev. J. W. B. Bell, Vicar of Pyrton, Oxon, presented in 1921; that of Arthur Sidgwick, Esq., M.A., in 1922; and that of Professor W. M. Geldart, also in 1922.

Mr. Bell's collection was made within a radius of five miles from Pyrton Vicarage, in the years 1890 to 1915, and contains examples of nearly all the species that occur regularly in Oxfordshire. Specially worthy of note in it is a very beautiful specimen of a female *Agrotis cinerea*, apparently quite recently emerged, and series of *Triphaena orbona* (*subsequa*), *Xylina semibrunnea*, and *Lycaena bellargus*.

Mr. Sidgwick's collection is a large one, made in various localities both in England and Scotland, and, besides containing specimens of very rare or local species, has one example of a species new to Britain, viz. *Cucullia lactucae*. He kept a very full and careful diary from 1887 to 1913, recording apparently every specimen he caught, and every specimen he caught or bred has a label with full data attached to the pin.

Professor Geldart's collection also is a large one, made in many localities in Ireland as well as in England and Scotland.

In addition to these collections considerable additions have been made through the generosity of other collectors, chief among whom are Mr. B. H. Crabtree, Mr. J. Collins, Col. Donovan, Mr. T. Greer, Mr. C. F. Johnson and the Rev. C. F. Thornehill.

The following is a list of some of the rare or local species in the Sidgwick Collection :

A fine series of *Nomiades arion* from the Cotswolds.

6 *Drymonia trimacula* (*dodonea*), Oxford district,

2 *Palimpsestis octogesima*, Oxford district,

A long series of *Acronycta ligustri*, including several ab. *coronula*,

7 *Triphaena orbona* (*subsequa*),

7 *Plastenis subtusa*, and

9 *Xylina semibrunnea*,

all taken in the Oxford district.

1 *Leucania vitellina* labelled in his own writing "ct. sugar, Boars Hill (4 October 1900) Oxford. A. Sidgwick."

Cucullia lactucae.—This bred specimen of a species hitherto unrecorded in Britain emerged June 3, 1900, and is so labelled. In the diary for 1900 is an entry on the date June 3, with his peculiar mark indicating that the specimen recorded was bred, "*umbratica*" under which species he placed it in his cabinet. When I was occupied in selecting specimens in his collection for embodying in the Museum Collection I noticed it was rather different from the rest of the series, having much more of a blue tinge, and Commander J. J. Walker, who was looking over my shoulder, suggested that it might be *C. lactucae*. When the specimen was sent up to the Natural History Museum at South Kensington for determination his suggestion was confirmed by Messrs. W. H. T. Tams and J. H. Durrant. The record in the diary, however, does not say whether the insect was obtained as a larva or a pupa. The larvae of *umbratica* and *lactucae* are very distinct and it is impossible for one who knows them to confuse them, but it is quite possible that Mr. Sidgwick did not know the larva of *umbratica*, which is very cryptic, and hardly ever seen except by those who breed it from the egg. He might have bred it from a pupa, though the cocoon of any species of *Cucullia* is very rarely found. On its emergence he took it to be *umbratica*, which it closely resembles. There is no reason why *C. lactucae* should not occur in the south of England, and from its close resemblance to *umbratica* (the most obvious distinction is the bluer tinge of *lactucae*) it can easily be overlooked. It would be worth the while of collectors in the south to examine carefully their series of *umbratica* to see whether it contains an overlooked specimen of *lactucae*. Commander Walker has recorded the specimen in the *Entomologist's Monthly Magazine* in the January number of 1923.

A series of *Hydroecia crinanensis* from the Lake District.

2 *Plusia bractea*, labelled Enniskillen.

1 *P. chryson*, Cambridge.

2 *Acidalia nigropunctata* (*strigillaria*) labelled Folkestone, July 1, 1903, and Aug. 23, 1900, respectively.

2 *Phibalapteryx polygrammata* labelled, one Cambridge, 1865, the other Cambridge, 1873.

1 *Eupithecia insignata* (*consignata*) labelled "Oxford district, June 7, 1900."

A very remarkable gynandromorph of *Bupalus piniaria*, in which the entire right side of the insect is male and the left side female, has unfortunately no data.

The following are some of the most noteworthy insects in Professor Geldart's collection:

Lycaena icarus, a gynandromorph in which the right side is male, the left female. Labelled "I. of Wight, Alum Bay."

2 *Palimpsestis fluctuosa*, Lake District, 1903.

2 *Deiopeia pulchella*, both taken by the Professor on the same day in June, 1892, at Bembridge, I. of Wight.

A fine series of *Agrotis cinerea*, Folkestone, 1897.

A long series of *Mamestra albicollis* from Cornwall.

2 *Crymodes exilis* var. *assimilis*, one from Rannoch, July 3, 1906, the other from Ross-shire, June, 1891.

A fine series of *Leucania turca* from Wimbleton and Richmond Park.

1 *Plusia bractea*, from Lahinch, County Clare, Ireland.

1 *Acidalia nigropunctata* (*strigillaria*) labelled "Folkestone, July, 1889."

A very fine specimen of *Xanthorhoe montanata* var. *costimaculata*, labelled "Wyre Forest, 1889."

7 *Fidonia limbaria*, labelled "Achinalt, Ross-shire, 1891."

In addition to these collections are contributions from private collectors and specimens purchased from Mr. L. W. Newman and at the sale of various collections.

A most generous donor has been Mr. B. H. Crabtree. The following are some of the most important of his gifts:

6 *Palimpsestis fluctuosa*, from various localities.

3 *Parasemia plantaginis* var. *hospita*.

2 *Cosmotriche potatoria*, yellow males from Cambridge.

6 *Dianthoecia caesia*, from the I. of Man.

4 *Crymodes exilis*, from Unst.

2 *Leucania favicolor*, Harwich.

2 *L. albipuncta*, I. of Wight.

6 *Taeniocampa opima*, Wallasey, bred.

2 *Acidalia humiliata*, I. of Wight, 1899 and 1900.

Other generous contributors have been Mr. C. F. Johnson, Mr. T. Greer, who gave many Irish insects; the Rev. H. D. and Mr. E. B. Ford, who gave a series of 18 *Aphantopus hyperanthus*, ab. *arete* and ab. *caeca*, from the Carlisle district; Col. Donovan, who contributed many species from Berkshire, including a specimen of *Caradrina exigua* taken by him at sugar near Faringdon, Sept. 3,

1923, and 6 bred *Cirrhædia xerampelina* from the same locality; Mr. J. Collins, 7 *Lithosia sericea* from Rixton Moss; and Mr. L. W. Newman, who presented 2 very interesting melanic *Demas coryli*.

Several additions have also been made by purchase, mainly through or from Mr. L. W. Newman. Chief among them are a series of *Pieris napi* ab. *flava*, from the Horne Collection.

1 *Hydrilla palustris* and 30 *Acosmetia caliginosa*, from the Prest Collection.

3 *Leucania favicolor*, from North Kent.

4 *Mellinia ocellaris*, from the Thames Valley.

6 *Plusia chryson*, from Chippenham and Tuddenham Fens.

6 *P. bractea*, from Rannoch.

The late Mr. Rowland-Brown bequeathed to the Museum his collection, which included that made by the Rev. F. E. Lowe, consisting mostly of continental species. From these collections a series of *Chrysophanus dispar*—6 from the Lowe and 2 from the Rowland-Brown collection, have been taken and added to the British cabinet.

Mr. W. G. Sheldon has kindly inspected and given the varietal name to every specimen of *Sarrothripus revayana* in the collection, 150 in all, and they are now labelled and arranged according to the classification by Mr. Sheldon in his papers on the species in the *Entomologist*, vol. lii, pp. 97 and 122.

ASSEMBLING ARCTIA VILLICA.—Having recently bred *Arctia villica* from eggs obtained last year, I thought I would try to obtain some males by means of assembling. I was not very successful in obtaining forms of much variation, but think that the following notes of the times of visitation by the males may be of interest. On June 14th at 8 p.m. I placed a female in a perforated zinc cage in the garden and awaited results. Not a single male put in an appearance till 10.30 p.m., but from then till 11.5 p.m. the males arrived. On the 15th I placed two females out at the same time, and once more no moths arrived before 10.30; the males then came till 11 p.m., when their visits ceased. I have repeated the experiment every night until June 20th, and always the males both arrive and cease coming at exactly the same time. I have kept observation till 1 a.m. and then placed the females in a room with the window slightly open for the rest of the night, but no males come near. The males come singly at first, but at 10.45 p.m. there were often ten to twelve round the cage at once. From this maximum they gradually dwindle, till, as I have stated, none appear after 11.5 p.m. It seems extraordinary that the times of appearance and absence of the males in seeking the female should occur with such unfailing regularity. With regard to variation I have taken three with the cream spots on the upper wing partially joined, and one without black spots on the lower wing and very small cream spots on the upper.—H. JENNINGS; Marlowes, Barton Court Avenue, New Milton, Hants. June 22nd. 1925.

20

REPRINTED FROM

THE ENTOMOLOGIST

Vol. LVIII, January, 1925.

SUBSCRIPTION 12s. PER ANNUM, POST FREE

LONDON

ADLARD & SON & WEST NEWMAN, LTD.

BARTHOLOMEW CLOSE

ADLARD & SON & WEST NEWMAN, LTD.

THE ENTOMOLOGIST: A Journal of General Entomology.

Monthly. Edited by N. D. RILEY, F.E.S., F.Z.S., assisted by Messrs. ADKIN, FROHAWK, GAHAN, LUCAS, MORLEY, SOUTH and SHELDON. 1s. 6d. net.

Contains original articles, by well-known Entomologists, on every branch of the science; notes on the habits and occurrence of Lepidoptera, Coleoptera, Hymenoptera, Diptera, &c.; Proceedings of Societies; Reviews, &c. Monthly lists of Duplicates and Desiderata. Subscription for one year, including all double numbers, and postage to any part of the world, 12s., should be addressed to Mr. N. D. RILEY, 5, Brook Gardens, Barnes, S.W. 13.

THE 'ENTOMOLOGIST' SYNONYMIC LIST OF BRITISH LEPIDOPTERA.

By RICHARD SOUTH, F.E.S. Demy 8vo. For reference only, 6d.

[OUT OF PRINT.]

The Exchange List (containing the whole of the British Lepidoptera complete on a single sheet), 2d., post free 3d.; one penny stamp is sufficient for a number of copies.

AN ACCOUNT OF THE BRITISH HIERACIA.

By the Rev. W. R. LINTON, Vicar of Shirley, Derby. Pp. i-viii and 1-96. Stiff paper cover. Price 4s., postage 6d.

"Mr. Linton has long made a careful study of the British forms of *Hieracium*. . . . The book is well printed."—*Journal of Botany*.

FIRST STEPS IN THE PRINCIPLES OF FLOWER CLASSIFICATION ACCORDING TO THE NATURAL SYSTEM. By the Rev. A. C. MORRIS. Price 9d. post free..

A FLORA OF THE ISLAND OF JERSEY.

By L. G. LESTER-GARLAND, M.A., F.L.S. With Coloured Map by J. G. BARTHOLOMEW. Crown 8vo, 3s. net, postage 4d.

BRITISH OAK GALLS.

By EDWARD T. CONNOLD, F.Z.S., F.E.S., Author of 'British Vegetable Galls,' 'Gleanings from the Fields of Nature,' 'Plant Galls of Great Britain,' etc. Demy 8vo, cloth, pp. 169 + xviii and 68 Plates. Price 10s. 6d. net, postage 6d.

ALIEN FLORA OF BRITAIN.

By STEPHEN TROYTE DUNN, B.A., F.L.S., Superintendent Botanical and Afforestation Department, Hongkong. Author of 'Flora of South-West Surrey,' &c. Demy 8vo, cloth extra, 208 pp. + xvi. Price 5s., postage 6d.

NOTES ON THE SERIES OF *PERONEA CRISTANA* IN
THE DALE COLLECTION, AND ON THE TYPE-
SPECIMEN OF *AB. GUMPINANA* JOHNSON,
INCLUDED THEREIN.

BY W. G. SHELDON.

THROUGH the kindness of Prof. Poulton I have been able to examine at leisure the fine series of this species in the Dale Collection, bequeathed to the Hope Museum at Oxford by the late C. W. Dale.

The series consists of 216 specimens, and includes quite a number of rare forms; by far the most important, however, is the actual type-specimen of *ab. gumpinana* Johnson, labelled by C. W. Dale, "Johnston* New Forest." This identification is important, because it finally clears up a question that has long been in doubt, *i. e.* what *ab. gumpinana* really is. Clark, in his paper on *P. cristana* in *Ent. Record*, xiii, p. 289, writes of "*ab. gumpinana* n. ab.," afterwards corrected in vol. xvi, p. 146, by him to "*ab. gumpinana* Johnson," as follows: "Head, thorax and palpi white, the anterior wings light brown, mottled all over with white; a broad white vitta joins the white marking at the base; a faint trace of a white button." Webb, *Ent.*, xliii, p. 200, criticizes Clark thus: "Specimens have hitherto been incorporated with our series of *subcapucina*, more uniformly sprinkled with grey and white, of a smoother aspect, and wanting the two white square blotches towards the hind margin, whilst the central tuft was either very small or entirely wanting. These were pointed out to friends years ago as deserving a varietal name, but it was a great surprise, I suspect, to others as well as myself when Mr. Clark gave it this one. Of course he was in error when he said this plain coloured moth had been known for many years in our sale-rooms under this name, and Clark afterwards (*Record*, xvi, p. 145) corrects the impression his first article may have made upon his readers by giving Mr. Johnson's definition of *gumpinana* as originally described, but unfortunately he does not

* The spelling Johnston is incorrect. It should, of course, be Johnson.—W.G.S.

withdraw his own erroneous name, so that this well-marked and distinctive variety still awaits a befitting title, and I would propose that it be known as *ab. clarkiana*."

Webb then goes on to describe what he considers *ab. gumpinana* Johnson really is, his view being that it is an aberration subsequently named by me (*Ent.*, li, p. 24) *ab. ochreana*. The Dale type does not, however, agree with this form, but it does agree exactly with the form written of by Webb, *l. c.*, "Two specimens, of which one was labelled 'New Forest 2.10.1905,' were in Clark's cabinet as *tolana*"; "of course they have no affinity with *tolana*."

This form was described by me in *Ent.*, liv, p. 36, and named *ab. flavana*.

3 It is interesting to note that whilst an example of *ab. clarkiana* Webb from the New Forest is not, so far as I am aware, known, there are several examples of *ab. gumpinana* Johnson—as now identified—known from there, including of course the type—four examples in my own collection, and one in that of Mr. South.

The synonymy of the various forms discussed above is as follows:

ab. gumpinana Johnson = *ab. flavana* Sheldon.

ab. clarkiana Webb = *ab. gumpiana* (corrected to *gumpinana*) Clark.

Other rare forms in the Dale Collection include 4 *ab. tolana* Desvignes, 1 *ab. masoniana* Clark (labelled *ab. curtisana* Desvignes); 1 *ab. ochreana* Sheldon; 6 *ab. capucina* Johnson; 17 *ab. subcapucina* Desvignes; 6 *ab. unicolorana* Desvignes; 3 *ab. transversana* Clark; 2 *ab. procrystalana* Webb; 3 *ab. xanthovittana* Desvignes; and 10 *ab. alboflammana* Curtis.

West Watch, Limpsfield;

November 22nd, 1924.

ADLARD & SON & WEST NEWMAN, LTD., 23, Bartholomew Close, London.

FLORA OF SOUTH-WEST SURREY.

A Handy Pocket Field Guide to the Botany of the District. By S. T. DUNN, B.A. Crown 8vo, 3s., postage 4d.

VIGOUR AND HEREDITY.

By J. LEWIS BONHOTE, M.A., F.L.S., F.Z.S. Demy 8vo. Cloth. With 3 Coloured and Uncoloured Plates and Text Illustrations. Price 10s. 6d. net.

THE INSECT HUNTER'S COMPANION.

By the Rev. JOSEPH GREENE, M.A. Revised and extended by A. B. FARN. The Chapter on Coleoptera by EDWARD NEWMAN; on Hymenoptera by FREDERICK SMITH; on Breeding Gallflies by EDWARD A. FITCH. Sixth Edition now ready. With Illustrated Appendix on Entomological Technique by L. N. STANILAND. Price 3s. 6d. net, postage 3d.

PLANT GALLS.

By EDWARD T. CONNOLD, F.Z.S., F.E.S., Author of 'British Vegetable Galls,' 'Gleanings from the Fields of Nature,' 'British Oak Galls,' etc. Crown 8vo, cloth, pp. 292. Price 5s. net, postage 4d.

THE POCKET-BOOK OF BRITISH BIRDS.

By E. F. M. ELMS. With description of British species and distinguishing characters; habits; food; language or song; nest and eggs. Foolscap 8vo, cloth, 110 pp. + blanks for Notes. Price 3s. 6d., postage 4d.

"An inexpensive volume which well deserves to be a 'pocket-book' for those who wish to become field ornithologists."—*Zoologist*.

HINTS ON COLLECTING AND PRESERVING PLANTS.

By STANLEY GUITON. Chapters on Collecting and Equipment, Drying, Preserving and Arranging, Mounting, &c. Fully Illustrated. Crown 8vo, 64 pp., 1s. 6d., postage 3d.

"Useful to schools, or classes, field naturalists' clubs, or to anyone interested in the collection of specimens of our native flora, or who wished to prepare and bring or send home specimens from abroad."—*The Field*.

FAMILIAR INDIAN BIRDS.

By GORDON DALGLIESH. Second Edition. 100 pp., cloth, gilt, price 2s. 6d. Illustrated by half-tone Blocks from the Drawings of R. H. BUNTING and H. B. NEILSON.

This little book is intended mainly for those who live in, or visit, India, are interested in the birds they are likely to meet in everyday life, and wish to learn something about them. The author writes from personal knowledge and observation.

ADLARD & SON & WEST NEWMAN, LTD., 23, Bartholomew Close, London.

BIRDSNESTING AND BIRD-SKINNING:

A Complete Description of the Nests and Eggs of Birds which Breed in Britain. By EDWARD NEWMAN. *Second Edition. With Directions for Collecting and Preservation; and a Chapter on Bird-skinning.* By MILLER CHRISTY. Cloth extra, Fcap 8vo, 2s., postage 4d.

WORKS ON AGRICULTURAL ENTOMOLOGY by the late MISS ORMEROD, LL.D.

HANDBOOK OF INSECTS INJURIOUS TO ORCHARD AND BUSH FRUITS. *With Means of Prevention and Remedy.* Demy 8vo. 300 pp. Cloth extra, 5s., postage 4d. Profusely Illustrated.

"The completest guide on the subject that has yet been issued in any country or in any language. . . . Absolutely indispensable to every landowner, farmer, gardener, or fruit-grower in these islands. It is thorough in every section, practical in every page, sound in all its advice, and up-to-date in every line of its information."—*Land Agent's Record*.

A TEXT-BOOK OF AGRICULTURAL ENTOMOLOGY, *being a Plain Introduction to the Classification of Insects and Methods of Insect Life, with Means of Prevention of Insect Ravage; suited for the use of agriculturists and agricultural teachers and students.* One vol., 238 pp.; 164 figures. Crown 8vo, 5s., postage 4d.

"An excellent guide, full of sound and practical information, which will be found equally useful for either farmer or gardener in his daily work, or for the teacher or student in the class-room."—*Times*.

ELEANOR ORMEROD, LL.D. *Economic Entomologist. Autobiography and Correspondence.* Edited by ROBERT WALLACE, Professor of Agriculture and Rural Economy in the University of Edinburgh. *With Portrait and thirty Plates and more than eighty Illustrations in the Text.* Pp. 348 + xx. Demy 8vo. Extra gilt top. Price 5s. post free. *This is the Autobiography published at One Guinea in 1904.*

Newman's Botanical Drying Paper.

For drying Flowers, Ferns, Sea-weeds, and other specimens for the Herbarium.

Preserves Form and Colour, and seldom, if ever, requires a change of sheets. Durable and economical. Used by the Naturalists on board the Arctic ships, and on the 'Challenger' Expedition, and at various public Herbaria.

"Combines in a very satisfactory manner the merits of a high degree of absorbence with a reasonable toughness. No doubt, for drying plants, it is the best paper that can be got."—*Nature*.

"By far the best paper for drying specimens of plants."—*The late Prof. Babington*.

PRICES ON APPLICATION.

ADLARD AND SON AND WEST NEWMAN, LTD., IMPR., LONDON AND BOKING.

BRITISH ORTHOPTERA IN THE DALE COLLECTION.

II. GRASSHOPPERS.

BY W. J. LUCAS, B.A., F.E.S.

(Concluded from Vol. XLVII, p. 138, 1911.)

Reprinted from 'The Entomologist's Monthly Magazine,' Vol. lxi.

In June, 1911, appeared in this Magazine a list of the British Orthoptera (except the Grasshoppers—Locustodea and Acridiodea) contained in the Dale Collection, housed in the Hope Department of the University Museum at Oxford. After a long interval, the opportunity arose of examining the Grasshoppers, and thus completing the catalogue of the 'Dale' Orthoptera. In the list that follows every insect is noted, although there may be little or nothing in the way of data accompanying it. Many, being entirely without a discriminating mark of any kind, are consequently of but little value. Of the four drawers containing the Orthoptera, three and

about one-third are occupied by the grasshoppers, the great majority being Acridians. One or two (but not many) are wrongly placed. In many cases the writing on the labels can with fair certainty be referred to one of the two Dales—father and son—and this is sometimes stated by means of the initials, J.C.D. and C.W.D. respectively; but the writing of the latter is occasionally almost indecipherable. The collection contains 58 Locustids and 267 Acridians.

LOCUSTODEA.

Odontura punctatissima* (= *Leptophyes punctatissima* Bosc.†). Six specimens—♂ ♂ ♂ ♀ ♀ ♀, all without a label.

Meconema varium (= *Meconema thalassinum* De Geer). Six specimens—♂ ♂ ♂ ♂ ♀ ♀, all without a label.

Xiphidium dorsale (= *Conocephalus dorsalis* Latr.). Eight specimens—♂, 'Freshwater, Sept. 1865' (C.W.D.'s writing); ♂, 'Freshwater, Isle of Wight, Sept. 1865' (C.W.D.'s writ.); ♂, 'July 1837' (printed label with 37 written in); ♂ ♂ ♀ ♀ ♀ without a label.

Thamnotrizon cinereus (= *Pholidoptera griseoptera* De Geer). Two specimens—♂, 'Glanvilles Wootton in Wootton Wood, Sept. 12th, 1874'; ♀, 'Gl. Wootton, July 22nd, 1866.'

Platycleis brevipennis (= *Metrioptera roeselii* Hagenb.). Two specimens under this name, but the former is a macropterous female of *C. dorsalis*, bearing a label in pencil, 'Mrs. Hutchinson, 1878.' The other is a *M. roeselii* but without label.

Platycleis brachypterus (= *Metrioptera brachyptera* Linn.). Eleven specimens—a nymph, 'St. Alban's Head' (? C.W.D.'s writ.); ♂, 'Thorne Moor,' and a yellow printed label 'Aug. 11, 1837' (11 and 37 written in); ♂, 'Dorset'; ♂ ♂ ♂ ♀ ♀ ♀ ♀ ♀, without label.

Decticus griseus (= *Metrioptera albopunctata* Goeze). Ten specimens—♀, 'Portland'; ♂ ♂ ♂ ♀ ♀ ♀ ♀ ♀ ♀, without label.

Decticus verrucivorus (= *Tettigonia verrucivora* Linn.). Five very interesting and somewhat historical specimens—♂ and ♀ of the brown form. By the side of the female are two labels, 'Christ Church' and 'Bingleii Dale,' no doubt referring to both insects. ♂ ♂ ♀ of the green form. ♂, 'Rochester' (by the side); ♂, 'July 3, 1844' (3 and 44 written in); ♀, '† Walcott, 1844.'

Phasgonura viridissima (= *Phasgonura viridissima* Linn.). Eight specimens—♀, 'Freshwater, Sept. 1865' (C.W.D.'s writ.); ♀, 'Land's End, Ag. 1864' (C.W.D.'s writ.); ♂ ♂ ♂ ♀ ♀ ♀, without label.

ACRIDIODEA.

Gomphocerus biguttatus (= *Gomphocerus maculatus* Thunb.). Forty-four specimens under various names. Perhaps Dale considered that our *G. maculatus* consisted of several species—♂, 'Chefoil' (?), and 'Salisbury' (by the side); ♂, 'July 25, 1826' (25 and 26 written in); ♂, 'Freshwater' (in pencil), and 'Aug. 5, 1824' (5 and 24 written in); ♂, unlabelled; ♀, 'Salisbury Plain' (in pencil); ♀, 'Freshwater' (in pencil). The above six have 'elegans Ste.' by the side.

♂, unlabelled; ♀, a simple square of green paper; ♀, 'B.mouth 46'; ♂, the figure '7'; ♂, 'Thorne,' and 'July 25, 1837' (on yellow paper, 25 and

* Name used by Dale.

† Name used at the present time.

37 written in); ♀, 'Thorne,' and 'Aug. 11, 1837' (on yellow paper, 11 and 37 written in); ♀, 'Hampsted, June 1831,' and 'June 1831' (on pink paper, 31 written in); ♀♀, unlabelled. The above nine have 'apricarius Zett.' by the side.

♂, 'Chesil Beach, June 23rd, 1874'; ♀, '521,' and 'Jul. 14, 1822' (on yellow paper, 14 and 25 written in); ♂, square of green paper, 'Aug. 4/64' (C.W.D.'s writ.), and 'Land's End'; ♀, 'Mt. Barule, Aug. 1832,' and 'Aug. 1832' (on green paper, 32 written in); ♂, 'Mount Barule, Aug. 1832,' and 'I. of Man' (by the side on green paper); ♀, Mount Barule, Aug. 1832,' and 'Aug. m 1832' (on green paper, m and 32 written in); ♀, '32,' and a square of yellow paper; ♂, '120,' and yellow square; ♀, '1008,' and 'Aug. 3, 1825' (3 and 25 written in); ♂, '684,' and 'July 21, 1825' (21 and 25 written in); ♀, '280,' and 'Jul. 8, 1825' (8 and 25 written in); ♂, unlabelled. The above twelve have '===' by the side.

♂, square of blue paper; ♀, figure '2'; ♂, 'ericetarius Lea'; ♂, '6/1/42'; ♀, 'variegata Steph.'; ♀, '120,' and yellow square; ♂♂♀♀♀♀, unlabelled. These thirteen are labelled below 'ericetarius Lea.'

♂♀♀♀, unlabelled individually, but having below the label 'biguttulus Charp.'

Gomphocerus rufus (= *Gomphocerus rufus* Linn.). Forty-six specimens, under various names, which Dale may have considered specific—♂, 'London' (J.C.D.'s writ.), and a printed label 'Battersea' which no doubt refers to the next also; ♀, 'London' (J.C.D.'s writ.); ♂, 'New Fo.', and 'Aug. 12, 1827' (12 and 27 written in); ♂, 'New Fo.'; ♂, 'New Fo.', and 'Aug. 12, 1827' (12 and 27 written in); ♀, 'New Fo.', and 'Oct. 1, 1830' (1 and 30 written in). [A printed label 'New Forest' below refers to the four examples above it.] ♀, 'London' (J.C.D.'s writ.); ♂, 'Dover'; ♂, blue square only; ♀, blue square only; ♂, '♂' (written), and 'obscura Steph.'; ♂, unlabelled but with 'venosus Steph.' below; ♀, 'Castletown, Aug. 1832,' and 'Aug. 1832' (on green paper with 32 written in); ♀, 'Sep. 28, 1830' (28 and 30 written in); ♂, '44/9'; ♀, unlabelled but 'varipes Steph.' on a label below, perhaps referring to the four insects above the label; ♀, 'Lodmoor' (J.C.D.'s writ.); ♀♀♀, unlabelled. ['mollis Charp' on a label below probably refers to the four insects above it.] ♂, 'Saugus Point, Castletown, 1832,' and 'Aug. 1832' (on green paper with 32 written in); ♀, 'Portland, 28/10/30'; ♀, 'Nov. 8, 1860' (8 and 60 written in), and '8/11/60'; ♀, blue square only. ['rubicunda Ste.' on a label below probably refers to the four insects above it.] ♀, unlabelled; ♀, blue square only. ['biguttula var. Fisch' on a label below may refer to both specimens above it.] ♀♀♀♀, unlabelled; ♀, 'lineata Pz.'; ♀, 'Weymouth'; ♀, '♀' only; ♀♀, unlabelled; ♀, 'Cornwall, Aug. 64,' and 'venosus Steph.' on a label below which may be intended to refer to the ten insects above it; ♂, unlabelled; ♂, 'Saugus Point, Castletown, Aug. 1832'; ♂, 'Dover,' and 'Oct. 22, 1860' (22 and 0 written in); ♂, blue square only; ♂, unlabelled; ♀, 'Oct. 7, 63, Hotwells' (written); ♂, '28/9/30'; ♀♀♀, unlabelled. ['rhomboideus Schaeff' on a label below the last may refer to the ten insects above it.]

Stenobothrus lineatus (= *Stenobothrus lineatus* Panzer). Eight specimens—♀♀♂, unlabelled; ♂, 'Hodd Hill'; ♂, '44/9,' and '44/9' (both written); ♀, 'Lulworth'; ♀, unlabelled; ♀, 'Aug. 9, 1835' (9 and 35 written in).

Stenobothrus viridulus (= *Omocestus viridulus* Linn.). Seventeen specimens—♀♀♀, 'July 6, 1861' (on yellow paper, 6 and 1 written in); ♀, '44/9' (written); ♂♀, unlabelled; ♂, 'G.W.' (written); ♀, '162,' and 'July 5,

1825' (on yellow paper, 5 and 25 written in); ♂, 'Mount Barule, Aug. 1832,' and 'Aug. 1832' (on green paper, 32 written in); ♂ ♀, unlabelled; ♀, 'Char-mouth Heath' (in pencil); ♀ ♀ ♀, unlabelled; ♀, 'rubroviridata Haw.'; ♀, 'Mount Barule, Aug. 1832,' and 'Aug. 1832' (on green paper, 32 written in); ♀, 'Cocks' (in pencil).

Stenobothrus rufipes (= *Omocestus rufipes* Zett.). Twenty-four specimens—♂, 'Gl. Wootton'; ♂, unlabelled; ♂, 'Wolmer' (? , written); ♂, unlabelled; ♂, 'Bm' (written); ♂ (?), 'July 6, 1861' (on yellow paper, 6 and 1 written in); ♂ ♀, unlabelled; ♀, 'Parley'; ♀, 'Aug. 12, 1819' (12 and 19 written in). [These ten are labelled below '*rufipes* Charp'.]

♂, 'Wyke, 57' (written); ♀, unlabelled; ♀, 'New Fo.' (written), and 'Sep. 30, 1830' (30 and 30 written in); ♀, 'New Fo.' (written). [These four are labelled below '*tricarinata* Ste.', but are incorrectly placed, being all *Chorthippus elegans* Charp'.]

♂ ♂ ♂, unlabelled; ♂, 'Bm' (written); ♂, '640' and 'July 21, 1825' (on yellow paper, 21 and 25 written in); ♂, unlabelled; ♂, 'Gl. Wootton,' and 'July 21, 1838' (21 and 38 written in); ♀, 'Parley'; ♂ ♀, unlabelled. [Dale probably intended the label '*miniatus* Charp' below to refer to the ten insects above it.]

Stenobothrus elegans (= *Chorthippus elegans* Charp.). Twenty-two specimens—♂ ♂ ♂ ♂, unlabelled; ♂, ' $\frac{4.4.9}{2.1}$ ' (written in red ink); ♂, unlabelled; ♂, 'Cams' (written), and 'June 29, 1833' (printed in red, 23 and 33 written); ♀, 'Lodmoor' (written); ♂ ♀, unlabelled; ♀, 'B. Cliff, Aug. 57' (written in); ♀ ♀, 'Lodmoor' (written); ♀, 'Aug. 16, 1837' (printed in red, 16 and 37 written in), and 'Stilton Fen, 37' (written); ♀, 'Thorne' (written in red ink), and 'Aug. 17, 1837' (printed in red on yellow paper, 17 and 37 written in); ♀, 'Colchester' (written); ♂, 'Lodmoor' (written), and 'Weymouth'; ♀, 'Lodmoor' (written); ♂, unlabelled; ♀, 'Lodmoor' (written); ♂, a rectangle of white paper only; ♀, 'Aug. 16, 1837' (on red paper, 16 and 37 written in), and 'Stilton Fen, 37.'

Stenobothrus parallelus (= *Chorthippus parallelus* Zett.). Thirty-two specimens—♀, 'Wyke, Aug. 57' (written); ♀ ♀, unlabelled; ♂, green square only; ♂, 'Falmouth, Oct. 30th, 1873' (written below on mounting card); ♂, ' $\frac{4.4.9}{2.1}$ ' (written in red ink); ♀, 'Lizard, Oct. 23rd, 1873' (written below on mounting card); ♀, green square only; ♂, ' $\frac{4.4.9}{2.1}$ ' (written in red ink); ♂, green square only; ♀, 'Dover'; ♂, ' $\frac{4.4.9}{2.1}$ ' (written in red ink), and '*parallela* Zett.'; ♂, '529,' and 'Jul. 15, 1825' (on yellow paper, 15 and 25 written in); ♀, unlabelled; ♂, ' $\frac{4.4.9}{2.1}$ ' (written in red ink); ♂, unlabelled; ♀, blue square only; ♂ ♂ ♀ ♂ ♂, unlabelled; ♂, 'Chepril' (? , written); ♂, '527,' and 'Jul. 15, 1825' (on yellow paper, 15 and 25 written in); ♂, unlabelled; ♂ ♂, green square only; ♂, unlabelled; ♀, green square only; ♀, 'Dover' (written), and '27/10/60' (written); ♂, 'S.C., July 1833' (written); ♀, unlabelled.

Stethophyma grossa (= *Mecostethus grossus* Linn.). Ten specimens—♂, ♂ apparently, ♀, unlabelled; ♀, ' $\frac{4.4.9}{2.1}$ ' (written in red ink). [The label 'Studland' below presumably refers to all four insects.] ♂ ♂ ♂, individually unlabelled, but 'Parley Heath' below presumably refers to all three; ♂, ' $\frac{4.4.9}{2.1}$ ' (written in red ink); ♀ ♀, unlabelled. [The label 'Whittlesea Mere' below presumably refers to the three insects above it.]

Locusta cinerascens (= *Pachytylus danicus* Linn.). Two specimens—♂, 'Tangiers, Capt. Davis' (written); ♀, on a written label 'taken at Hammersmith, Sept. 1846, Mr. Stevens,' 'Hammersmith' (by the side, written

label), below labelled 'cinerascens' and 'Christii Curt.' [This latter insect seems to be *Pachytylus migratorius* Linn.]

Locusta migratorius (= *Pachytylus migratorius* Linn.). Six specimens—♂, 'Yarmouth, 1847, Mr. Farr' (written), and 'Yarmouth' (by the side); ♀, 'Yarmouth, 1847, Mr. Farr' (written), 'Norwich' (by the side); ♀, 'Newland, Sept. 1, 1859, Glan. Wootton, Dorset' (written), 'Sep. 1, 1859' (1 and 59 written in), and 'Glanvilles Wootton' (by the side); ♀, large red square only; ♀, James B (illegible), Harleston, Norfolk, from (illegible) 1897' [C.W.D. made a new copy of this label which had become almost illegible; but his copy is equally indecipherable], and 'Harleston' by the side; ♀, unlabelled.

Acrydium peregrinum (= *Schistocerca tartarica* Linn.). One specimen—♀, 'Penzance, Sept. 1868,' and 'Penzance' (by the side).

Locusta caerulescens (= *Edipoda caerulescens* Linn.). One specimen—♀, unlabelled.

Acrydium subulatum (= *Tetrix subulatus* Linn.). Twenty-one specimens—♀ ♀, a pink square, and 'W.M.' (in pencil); ♀, 'Whittlesea'; ♀, 'W.M.' and 'July 9, 1819' (on pink paper, 9 and 19 written in); ♂ ♀ ♀ ♀ ♀ ♀, unlabelled; ♂, 'y (or 7) Thorne' (written), 'July 1837' (on pink paper, 37 written in), and 'York' (by the side); ♀ ♂ ♂, unlabelled; ♀, unlabelled, but the specimen in *Tetrix bipunctatus*; ♂, unlabelled; ♂, 'Oct. 66'; ♀ ♂, unlabelled; ♀, 'Oct. 66'; ♂, unlabelled.

Acrydium bipunctatum (= *Tetrix bipunctatus* Linn.). Thirty-two specimens—nymph, yellow square, and '769' (?) (written on mounting card); nymph, 'Dr. White, Jun. 1870' (on yellow paper, Dr. White and 70 written in); nymph, 'Deal, 1897' (?) (written on the mounting card). [These three nymphs are labelled 'Schranksi' below.] Nymph, green square only; nymph, green squares only; nymph, 'Land's End'; ♀, 'G.W., 1895'; ♂, unlabelled; ♂, 'G.W., 1895,' but the insect is *Tetrix subulatus*; ♀ ♀ ♀ ♀ ♀ ♀, unlabelled. [A label below with 'nigricans Sow.' perhaps refers to the twelve preceding insects.] Nymph, unlabelled; ♂ ♀ ♂ ♀ ♀ ♀, unlabelled. [On a label below is 'Pinnula Curt.', which perhaps refers to the six insects above it.] ♀, unlabelled; ♀, 'on Parley Heath, Hants—Oct. 13, 1820—,' and '295' (both written); ♀ ♂ ♀ ♀ ♀ ♀ ♀ and a nymph, unlabelled; ♀, '1/10/30'; ♀, unlabelled

Kingston-on-Thames,

October 1925.

Report of the Hope Professor of Zoology, 1915-1922.

The cessation of these Reports since 1913 was a result partly of the War, partly of circumstances explained in a combined account of the years 1913 and 1914 issued by the Department, and appearing in Vol. X of Hope Reports. Now that, in accordance with the wish of the Vice-Chancellor, the issue of Reports is to be resumed, it is necessary to state briefly the history of the years 1915 to 1922.

In spite of the interruption and lessened output of work due to the War, researches proceeded and were even in some respects favoured. Thus three of the naturalists who have done most for the Department, Capt. G. D. H. Carpenter, Capt. W. A. Lamborn, and the Rev. Canon K. St. Aubyn Rogers, entered ex-German E. Africa and made many interesting and important discoveries missed by the former rulers of that area. Furthermore some of the collections made in various parts of Africa, and abandoned by German collectors, ultimately found a home in the Hope Department.

In spite of the dangers to shipping, both letters and parcels of specimens arrived in great numbers, especially from the African ports. I do not know of a single letter or parcel lost on the specially dangerous route from the West Coast, although, only a few weeks before the Armistice, the fine observer and naturalist who sent them was drowned in the wreck of the *Burutu*—a grievous loss to science.

From the east side of Africa I only know of a single butter-

fly's wing in a letter which was lost with the *Persia*, and, from Easter Island, one butterfly which is believed to have gone down in the Falkland Battle (Proc. Ent. Soc. Lond., 1916, p. xciv).

The preparation of a Report which attempts to give, within a reasonable compass, some account of the Hope Department in the period since 1914 is far from easy, and it has been thought best to meet the difficulty by preparing a careful list of all papers written in the Department, or upon its material, between the end of 1914 and the beginning of 1923, and to treat the accession of specimens and other matters as briefly as possible.

Work done by the Staff.

Mr. H. Britten, whose experience and skill had been of great value, left the Department in 1918, and is now an assistant in the Manchester Museum. The increase in expenses has prevented the reappointment of a third assistant in the Department.

During the War Mr. Collins worked on munitions at the Eagle Foundry, and in this and in other ways expenses were reduced and the balances repaid to the University Chest. The yearly £100 from the Magdalen College Grant for assistance was relinquished, but regranted by the Delegates of the Museum in 1919. Since October, 1919, an anonymous friend of the Department has paid £13 yearly towards expenses.

It is impossible to attempt an account of the large amount of work carried out by Mr. Hamm and Mr. Collins since 1914, but it may be to some extent inferred from a study of the very imperfect list of accessions, and by realizing the amount of manipulation, printing, and labelling involved. Mention must, however, be made of Dr. R. C. L. Perkins's Hawaiian insects, Mr. W. Walmesley White's Tenerife Lepidoptera, and Commander Walker's New Zealand Coleoptera, all of which are arranged in the cabinet devoted to the illustration of island faunas.

The Collection of Pierinae.

Dr. Dixey has continued the arrangement of this important

group, and the working out of its material. How much this has involved may be gathered from the titles of his papers and the list of accessions; for the *Pierinae* are an important part of nearly every collection of Lepidoptera that is received. I wish that it were possible to acknowledge in greater detail the indebtedness of the Department.

The British Collections of Macro-Lepidoptera.

In this large and much-consulted section of the University Collections, also, it is impossible to do justice to all the kind help given by Mr. F. C. Woodforde, B.A., Exeter, and by his friends. Here, too something may be gathered from the lists of papers and accessions, but these will convey a very inadequate idea of the help that has been received.

Assistance in working out the Material of the Department.

In addition to above-named naturalists, Dr. H. Eltringham and Commander Walker have always been pleased to help on any work that was being conducted in the Department, many eminent specialists have visited Oxford and given much assistance, and still more have helped in the working out of material in London and elsewhere. I should wish to express gratitude to each separately, but the number is large and space limited. I must, however, refer to the courteous assistance invariably given by the staff of the Insect Department of the Natural History Museum, by Lord Rothschild and Dr. K. Jordan, of the Tring Museum, and by Mr. J. J. Joicey, Mr. G. Talbot, and Mr. L. B. Prout, of the Witley Museum.

Among those who have come to work in the Department, Mr. J. R. Baker, New Coll., consulted the Professor concerning a visit to the New Hebrides, and his insect collections made in these islands are now being worked out; Prof. J. F. Van Bemmelen studied the evolution of moth patterns; Miss L. L. Britten, seasonal dimorphism of African butterflies; Mr. H. J. Carter, Australian beetles; Dr. C. F. C. Beeson, D.Sc., I.F.S., Indian insects; Capt. H. M. Pendlebury, the main insect groups and problems of bionomics in preparation

for work in the F.M.S. Museum at Kuala Lumpur; Dr. R. Hanitsch, Ph.D., the continuation of his important work on the Malayan *Blattidae*.

The Oxford University Entomological Society.

A very encouraging event was the revival, in 1922, by junior members of the University, entirely on their own initiative, of the Oxford University Entomological Society, thus created anew after an interval of more than fifty years. The original rules in the old minute-book, preserved in the Department, have been followed, and the meetings, which are held three times in the term, have been most successful.

Fund for the Study of Social and Organic Evolution.

The work of the Department has been much helped and encouraged by the establishment in 1920, by Prof. James Mark Baldwin, Hon. D.Sc., of a fund for promoting the Study of Social and Organic Evolution, associated with the name of the Hope Professor. The value of the Fund, £100 yearly, is greatly increased by the wise and liberal freedom of the conditions. By its means two lectures have been given in the Department of Comparative Anatomy, one on the Evolution of Pattern in Moths, by Prof. Van Bemmelen, of Groningen, the other on the Production of Inter-sexes in the same Group of Insects, by Prof. R. Goldschmidt, of Berlin; furthermore, the expenses of an expedition to collect Lepidoptera in the Semliki Valley have been defrayed. The Buamba Forest, where Mr. C. A. Wiggins and Dr. G. D. H. Carpenter collected, forms part of the extreme eastern edge of the Great Congo Forest which stretches westward to the sea, and it is of much interest because it affords a passage between the typical conditions of that great sub-region (the West African of Wallace) and those of the open country and scattered forests of Uganda. The collection gave the opportunity of recording something of the bionomics and working out the affinities of that strange insect *Pseudopontia paradoxa*. Work upon other parts of the collection is proceeding. Furthermore, a sum has been set aside to assist in the illustration of a memoir by the Rev.

F. C. R. Jourdain, M.A., M.B.O.U., on the resemblance, in various parts of the geographical range, between the eggs of the cuckoo and those of its victims, a subject of the highest interest to the student of evolution.

Hope Reports.

The last-issued volumes of Hope Reports—VIII, VIII Appendix, and IX—appeared in July, 1913. The separata accumulated since this date will make five volumes, four of the usual size, and an appendix containing memoirs which would have been injured by inclusion in the regular series. The first of these five volumes is already bound and all will be distributed in the course of 1923.

Works published in 1915-1922.

In order to economize space, the titles of papers have been reduced and the references contracted as far as possible. Such a reference as "1918, xxvii" refers to the "Proceedings of the Entomological Society of London" for that year, while such as "1920, p. 84" refers to the "Transactions" of the same Society. The papers are arranged under the great Zoological Regions to which the insects belong, the last heading including those which deal with insects from more than one Region as well as with general subjects.

Ethiopian Region.

Cecil N. Barker, F.E.S.: (1) "Birds attacking Lepidoptera observed by H. Millar" (1918, xxvii; 1919, xxxiii); (2) "Seasonal forms of Natal Butterflies" (1918, lxxxiv); (3) "Notes on Natal Butterflies and one from ex-G.E.A." (1919, vii); (4) "The Ant-mimic Myrmecophana" (1919, xxxix); (5) "Coprid Beetles a supposed cause of illness: the Wiles of Medicine-men" (1921, lxvi).

G. H. Bullock, M.A., New College, with the Professor and Dr. Eltringham: "Butterflies from Fernando Po" (1916, viii, xciii).

Capt. P. A. Buxton, R.A.M.C.: "Note on Acraca from Sierra Leone" (1917, lxix).

Dr. G. D. Hale Carpenter, M.B.E., D.M., &c., Uganda Medical Service, and the Professor: (1) "A Geographical Race of the 'Small Copper' Butterfly in the S.W. Corner of Uganda" (1921, lxxxix; 1922, li, xciv). With help from the late Dr. T. A. Chapman, J. J. Joicey, J. J. Walker, British and Paris Museums; (2) "*Pseudacraea poggei*, new Mimetic Form *carpenteri*" (1918, v). Data also supplied by W. A. Lamborn (x), Dr. S. A. Neave (x, xvii), Lord Rothschild (xvii), Mr. J. J. Joicey (xvii). See also Proc. Linn. Soc., Lond., Nov. 1917–June, 1918, p. 10; (3) "A Warning Pattern displayed by certain Male Pierines while drinking" (1915, lxxvi). Also data by W. A. Lamborn (lxxviii).

Dr. G. D. Hale Carpenter, M.B.E., D.M., &c.: (1) "Habits of Hesperid Butterflies" (1915, xlv; 1916, cxxix; 1918, xxvii). Similar observations by Dr. G. A. K. Marshall, Dr. S. A. Neave, W. Feather, and W. A. Lamborn (1916, cxxx–cxxxix); (2) "Instinct of *Mantis pia*" (1919, lviii); (3) "Varied Observations on Insects, chiefly in Tanganyika Terr." (1915, lxxv, lxxxiii–xcii; 1916, cx–cxxx; 1918, lxxxviii–cxlix); (4) "*Pseudacraea eurytus hoblei*, its Forms and its Models on the Islands of L. Victoria, &c.," with pls. II–III and map (1920, p. 84; 1919, l); (5) "Association of Lycid Beetles" (1917, lvii); (6) "Asilid Fly mimicking Dragon-fly" (1917, lx); (7) "Birds attacking Butterflies, &c." (1915, lxiv; 1917, lxii); (8) "Experiments on the Relative Edibility of Insects, with Special Reference to their Coloration" (1921, p. 1; 1920, lix); (9) "Hemipteron devouring Lycaenid" (1915, lxiii); (10) "Habits of Fossorial Wasps" (1917, xli, lix); (11) "Spider attacking Ant" (1917, lx); (12) "The Fly *Bengalia* attacking wingless Termite" (1919, lviii); (13) "Pangonia on the wing attacking Man" (1916, lxxxiii); (14) "*Glossina palpalis* on Islands in Lake Victoria" (1919, xxxvii); (15) "Nuptial Flight of Butterflies" (1917, li; 1918, cl).

G. C. Champion, F.Z.S.: "Coleoptera recorded from 'Resin animé' by the Rev. F. W. Hope" (E. M. M., Jan. 1917, p. 7).

The late Dr. T. A. Chapman, F.R.S., and the Professor:

"The Lycaenidae *Epitola urania* and *E. posthumus*" (1918, xxv).

E. C. Chubb, Curator of Durban Museum: "Bud-and-flower-like Flatidae" (1918, lxxvii).

Rev. G. Cecil Day, M.A., Keble: "D. chrysippus seized and rejected by Bird" (1921, lxxiv).

Dr. F. A. Dixey, M.A., D.M., F.R.S., Sub-Warden of Wadham: (1) "Nuptial Flight of Butterflies" (1915, xlvii (mostly British); 1917, li; 1918, cl); (2) "Scent-scales of Male Pierine Butterflies" (1916, xlviii (Northern Belt); 1918, clxx); (3) "The Scent-scale of *Pinacopteryx liliana*," with pl. XVI (1919, p. 383, xli); (4) "*Nychitona medusa* and Mimic" (1915, xcvi); Dr. Carpenter's observations quoted; (5) "The charina Group of *Pinacopteryx*" (1918, p. 191, lxxv); (6) "Seasonal Forms of *Teracolus rogersi*" (1919, lxxiv).

The late H. Dollman, F.E.S.: "Charaxes etheocles and Allies" (1919, lxxv).

Dr. H. Eltringham, M.A., D.Sc., New College: (1) "On W. A. Lamborn's E. African Butterflies," with notes by Dr. F. A. Dixey, F.R.S., and the Professor (1917, p. 322, xlv); (2) "Four New African Species of *Neptis*" (E. M. M., Feb. 1921, p. 26); (3) "African Species of *Neptis*," with pls. XX-XXV (1921, p. 532, lxxvii); (4) "Certain Forms of *Acraca*," with pl. LXXIV (1916, p. 289, lxix); (5) "Species of *Larino-poda*," with pls. X-XI (1922, p. 254, xlvii); (6) "The Structure of the Scent-organs in certain Male Danaine Butterflies," with pls. XI-XX (1915, p. 152). Oriental species also included.

The late C. O. Farquharson, M.A., B.Sc., Aberdeen: (1) "Five Years' Observations (1914-1918) on the Bionomics of S. Nigerian Insects, &c." Edited, with a brief life of the author, by the Professor. With Systematic and Descriptive Appendix by R. S. Bagnall, G. T. Bethune-Baker, Dr. T. A. Chapman, F.R.S., J. E. Collin, J. Hartley Durrant, F. W. Edwards, Dr. H. Eltringham, Prof. J. Bronté Gatenby, D.Phil., D.Sc., Prof. R. Newstead, F.R.S., Prof. Poulton, F.R.S., Prof. F. Silvestri, Dr. J. Villeneuve, and Dr. J.

Waterston, B.D., D.Sc. With pls. IX-XIX (1921, p. 319; 1920, lviii); (2) "On a Termite-raiding Ant" (1915, v, lvi). Also notes by Dr. Carpenter, W. C. Crawley, H. Donisthorpe, E. E. Green, Dr. Neave, and C. F. M. Swynnerton; (3) "A Gnat fed by Ant" (1918, xxix, xxxviii, xxxix). Comments by H. Donisthorpe (xxix, xxxvi) and F. Muir (xxxviii); (4) "Life-histories of Nigerian Lycaenid Butterflies" (1917, lxi; 1918, lxxix; 1922, xxv); (5) "Hesperid Butterflies probably absorbing Salt" (1916, lxxx; 1917, lxxviii).

The late C. O. Farquharson, M.A., B.Sc., Aberdeen, with K. G. Blair, F.E.S., and the Professor: "A Colour-association of Nigerian Cantharid Beetles," with pl. B (1916, xcix).

W. Feather, F.E.S.: (1) "Bats attacking Moths" (1920, ii); (2) "Bud-and-flower-like Flatidae" (1918, lxxvii; 1920, iii); (3) "Eastern *P. dardanus* with W. Pattern" (1922, lxxv).

J. A. de Gaye, F.E.S.: "Habits of Hesperid Butterfly" (1915, xlv).

Dr. G. K. Kestell-Cornish, M.A., D.D., Keble, Bishop of Madagascar: "Butterflies from E. Coast of Madagascar: the Recent Invasion of the Oriental *H. bolina*" (1915, lxi; 1916, xxi; 1920, lviii). Note on *H. bolina* by M. C. Oberthür (1920, lviii).

Capt. W. A. Lamborn, F.E.S.: (1) "Resemblance of living female *Pap. dardanus* to Model" (1917, lxv); (2) "Habits of E. African Butterfly" (1918, xxiii); (3) "Observations during the E. African Campaign" (1918, xl); (4) "The use of Brushes and Scent-brands by a Male E. African *Danaine* Butterfly" (1918, clxxii); (5) "The Fly *Bengalia* robbing Ants, &c." (1919, li); (6) "Birds attacking Butterflies in E. Africa" (1919, xxxiv; 1920, xxiv, lvii). Note by Dr. Eltringham (1920, lvii); (7) "The Enemies of a Pierine Larva in E. Africa" (1920, xxix).

The late Dr. G. B. Longstaff, M.A., D.M., F.R.C.P., New College: "Butterflies of S. Kordofan collected by Capt. R. S. Wilson," with map (1916, p. 269, lvi).

A. Loveridge, F.E.S.: (1) "Bud-and-flower-like Flatidae" (1918, lxxvii; 1920, iv); (2) "The Oviposition of an E. African

Beetle" (1921, xc); (3) "A Raid by Driver Ants" (1922, xxxii).

Dr. S. A. Neave, M.A., D.Sc., Magdalen: (1) "Hesperid Butterflies probably absorbing Salt" (1917, lxxvii); (2) "Observations on Mimetic Likeness in Life" (1922, lxxxiv).

E. E. Platt, F.E.S.: (1) "A Family of *Acraea* encedon bred at Durban" (1915, xix); (2) "Attack of Bird on Butterfly" (1915, lxxii).

Prof. E. B. Poulton: (1) "Mimicry and Butterflies" (Proc. Roy. Inst., 1915, p. 372); (2) "W. Feather's Somaliland Moths," with pls. I-II. Descriptions by Sir G. F. Hampson, L. B. Prout, J. H. Durrant, and Dr. Karl Jordan (P. Z. S., 1916, p. 91).

The Rev. Canon K. St. Aubyn Rogers, M.A., Wadham: (1) "Habits of E. African Hesperid Butterflies" (1915, xlv; 1918, xxvi); (2) "Seasonal Forms of E. African Butterflies, &c." (1917, lxiii; 1918, lviii, lxxxvi); (3) "A Family of *Acraea* johnstoni bred at Sagalla, &c." (1915, lxxix); (4) "Forms of *Pap. dardanus* at Nairobi" (1921, xcii); (5) "Forms of *Mimacraea marshalli*" (1921, xciii); (6) "*Pap. rex* taken with its Model at Nairobi: Ancestral Form of the Mimic" (1921, xciv); (7) "Birds and Spiders as Enemies of Lepidoptera" (1916, lxxiv; 1919, li).

Dr. H. F. Standing: "The Flight of *Pap. antenor*" (1920, xc). Also Notes by E. E. Green and T. H. L. Grosvenor.

C. F. M. Swynnerton, F.E.S., Game Warden of Tanganyika Territory, and the Professor: "Forms of the E. African *Charaxes ethalion*" (1918, lxxix). Also of the allied *C. theocles* by the late H. Dollman (lxxx, n.), Rev. K. St. A. Rogers (lxxxi), Dr. Carpenter (lxxxii), W. A. Lamborn (lxxxiii), and the late C. O. Farquharson (lxxxiii).

C. F. M. Swynnerton: (1) "Mendelian Heredity in *Pap. dardanus* in S.E. Rhodesia" (1919, xxx); (2) "Habits of an E. African Danaine Butterfly" (1920, lxxv); (3) "Habits of an E. African Libytheine Butterfly" (1921, lxii); (4) "The Epigamic Song of an E. African Cicada" (1921, lxiii). Also data by A. Loveridge; (5) "Experiments on some Carnivorous

Insects, &c., and with Butterflies' Eggs as Prey" (1915, p. 317, lxxiii). Supplement (1915, p. 428).

Commander J. J. Walker, Hon. M.A., R.N.: "A Hesperid Butterfly attracted by Light" (1919, xxii).

C. A. Wiggins, C.M.G., P.M.O. Uganda Prot., Dr. G. D. H. Carpenter, and the Professor: "Notes on Pseudopontia paradoxa in the Semliki Valley" (1922, lvi). Also by Dr. Neave (lx), Dr. Dixey (lxi), Dr. R. J. Tillyard (lxv), and Dr. Eltringham (lxvi, with pl. B).

Lt.-Col. R. S. Wilson, F.E.S.: (1) "Habits of an E. African Hesperid Butterfly" (1917, lxvii; 1919, x); (2) "Wet and Dry Season Forms of *Precis octavia* from Nuba Hills" (1918, clxxvii); (3) "The Female *Charaxes viola* flying with its model *Ch. epijasius* in E. Africa" (1919, lxxvii; 1920, xxiii). Also observed by Capt. A. L. Kent-Lemon.

Oriental Region.

H. E. Andrews, F.E.S.: "Oriental Carabid Beetles of the Hope Department" (1919, p. 119, xxviii).

R. W. Barney: "Pap. polytes bred at Hong Kong" (1919, xxii).

Maj. T. D. Broughton, R.E., F.E.S.: "A Sikkim Asilid Fly attacking a large Pierine Butterfly" (1915, xlv).

Mrs. D. R. Fyson: "Forms of Pap. polytes near Madras City" (1915, xcii).

E. E. Green, F.E.S.: "Butterflies drinking Cutaneous Secretions" (1917, lxix).

Dr. R. Hanitsch, Ph.D., Director of Raffles Museum, Singapore: "Forms of Pap. polytes on Singapore Is. and the opposite Mainland" (1916, lxxvi; 1917, xxx, lxxxiii).

J. Williams Hockin, F.E.S.: "Forms of Pap. polytes in S. India" (1917, lxxx).

Col. T. Jermyn, F.E.S.: "Mimicry in Indian Butterflies" (1917, ix).

J. C. Kershaw: "Hesperid Butterflies probably absorbing Salt" (1917, lxviii).

Capt. W. A. Lamborn, F.E.S.: (1) "A bred Ornithopteron

with Pupa-cases from F. M. S." (1920, xc); (2) "A Male Danaine Butterfly observed brushing the scent-brands of its hind wing" (1921, xcv); (3) "A Hypsid Moth examined and rejected by Geckos" (1921, vii); (4) "Mantispa bred from Egg-cocoon of Spider" (1921, xcv).

Dr. Th. Mortensen: "A Shrew-like Moth from Java" (1922, lxxxiii).

Prof. E. B. Poulton: (1) "Proportions of Female Forms of Pap. polytes in different parts of its Range" (Rep. Proc. 3rd Entom. Meeting, Pusa, 1919, p. 903); (2) Continuation of above (ibid., 4th Meeting, Pusa, 1921, p. 259).

The late G. A. James Rothney, F.E.S.: "The Enemies of Winged Termites at Barrackpore" (1918, lxiv).

A. R. Sanderson, F.L.S., and T. R. Harvey: "Pierine Butterflies migrating from one valley to another in evening and back in morning, accompanied by Moth Mimics and these again by their Moth Mimics" (1920, lxiii; 1921, xii, with pl. A). Notes by Dr. F. A. Dixey and the Professor.

Australian Region.

G. C. Champion, F.Z.S.: (1) "The Dasytid Beetle *Acanthocnemus nigricans*, Hope" (E. M. M., Apr. 1922, p. 77); (2) "New Genus of Anthicidae" (Ann. Mag. Nat. Hist., May, 1916, p. 395).

W. C. Crawley, B.A., Worcester College: "Some Australian Ants," with Notes by the Professor (E. M. M., 1922, May, p. 118, June, p. 121).

F. P. Dodd, F.E.S.: "Observations on N. Queensland Insects" (1916, xxv).

Dr. F. A. Dixey: (1) "Mimicry in certain Butterflies of New Guinea" (1917, xc; 1918, p. 118); (2) "Geographical Factor in Mimicry," Pres. Addr. to Zool. Sect. Brit. Assoc., 1919, with pl. III (Rep., p. 199); (3) "Geographical Factor in Mimicry," with pl. VI (1920, p. 208).

Dr. H. Eltringham: "A Remarkable Pupal Structure," with pl. A (1919, xiv).

H. M. Giles, F.E.S.: (1) "Habits of Fire-beetle" (1915, iii).

Comments by C. F. M. Swynnerton and G. C. Champion (iv); (2) "A Buprestid Beetle" (1915, iv).

R. Kelly and the Professor: "Insects captured Feb. 20, 1915, at Eucalyptus flowers, Healesville, Vict." (1915, ci).

The Rev. F. D. Morice, M.A., Queen's: "Australian Sawflies" (1918, p. 247, with pls. XI-XV, clviii).

Lt. L. H. Mosse-Robinson, R.N.: "A Sphingid Moth from the Stomach of a Fish, Fiji" (1916, viii).

Dr. R. C. L. Perkins, F.R.S.: (1) "Small Variations inherited by Hawaiian Wasp" (1916, lxxxix); (2) "Life-history of Hawaiian Bethyridae" (1922, xxix).

Prof. E. B. Poulton: "Mimetic Resemblance between an Erycinid Butterfly and a Moth in New Guinea" (Bull. Hill Mus., 1922, p. 363).

W. Scoresby Routledge, M.A., Ch. Ch.: "The only Butterfly capt. in Easter Is. probably lost in Falkland Is. Battle" (1916, xciv).

Hubert W. Simmonds and the Professor: (1) "Mimetic Association between Euploeine and Danaine Butterflies in Fiji" (1919, lxix; 1920, lxxx); (2) "Habits of Moth Larva in Fiji" (1920, ii); (3) "Lepidoptera from Cook and Society Is." (1920, lxxii).

G. Talbot, F.E.S.: "Mimetic Butterflies from Tenimber Is." (1921, xxix).

R. E. Turner, F.E.S.: "Australian Ant mimicked by Fossor" (1919, xxxvi).

Commander J. J. Walker: "Insect Life in New Zealand," Pres. Addr. to Ent. Soc., Lond., Jan. 19, 1921 (1920, cvii).

J. H. Watson, F.E.S.: "The Form of *H. bolina* from Fanning Is." (1916, xxv).

Neotropical Region.

G. H. Bullock, M.A., New College, and the Professor: "Mimicry in Butterflies of W.C. Peru" (1921, xxxvi); (2) "Differential Attacks of Insect Pests" (1921, xxxviii).

G. H. Bullock, M.A., and Dr. Dixey, F.R.S.: "Certain Pierines of W.C. Peru" (1921, lxix).

Dr. H. Eltringham: "Specific and Mimetic Relationships of *Heliconius*," with pls. XI-XVII (1916, p. 101, xii, xlvii).

Dr. C. J. Gahan, M.A., D.Sc.: "A Luminous Beetle (*Phenodini*) in the Burchell Coll." (1917, xiv).

W. J. Kaye, F.E.S.: "On Dr. Eltringham's Paper on *Heliconius*" (1916, p. 149, xlviii).

The late G. A. James Rothney and the Professor: "Predaceous Insects and Prey from S.E. Brazil" (1917, xxxiv).

W. Scoresby Routledge, M.A., Ch. Ch.: "Habits of *Pap. homerus*" (1921, lxii).

C. B. Williams, M.A.: "Notes on Neotropical Insects" (1919, xxiii).

Palearctic Region, excluding British Insects.

Capt. P. A. Buxton, R.A.M.C.: "Insect Life in Mesopotamia (1917, lxxvi, 1919, x).

Dr. E. A. Cockayne, D.M., Balliol: "Warble-fly of Reindeer and its Model" (1921, lxxxix).

Prof. T. D. A. Cockerell, Univ. of Colorado: "A var. of *P. cardui* from Porto Santo" (1921, lxi).

Dr. F. A. Dixey, F.R.S.: "Scents of Male Butterflies from Lisbon, Madeira, and Tenerife" (1922, lxxiii).

C. H. Hamm: "*Vespa orientalis* neglecting killed but carrying off stunned Workers of its Species" (1919, lxix).

Dr. Karl Jordan, Ph.D.: "Asilid Flies and their Prey in the Harz Mtns." (1922, xlix).

R. E. Turner, F.E.S.: "Mimicry between two Chinese Sawflies" (1919, xxxvii).

Commander J. J. Walker, Hon. M.A., R.N.: "Occurrence of Butterflies in Iceland, &c." (E. M. M., Jan. 1922, p. 1).

Dr. J. Waterston, D.Sc.: "Mallophaga of the Oxf. Univ. Spitzbergen Expedition" (1922, xlvii).

E. N. Willmer, F.E.S., C.C.C., and Dr. Eltringham: "A Nemopterid from the Egyptian Desert" (1922, lxxx, civ).

F. C. Woodforde, B.A., F.E.S., Exeter College: "Lepidoptera from E. France" (E. M. M., Mar. 1921, p. 51).

British Insects.

R. S. Bagnall, F.L.S.: "*Lithobius lapidicola*, a new British Centipede" (Zoologist, Mar. 1914, p. 102).

Miss Balfour: "Breeding *Abraxas grossulariata*" (1922, lxxvi).

H. Britten, F.E.S.: (1) "Breeding *Mallota*" (1916, lxxxiii); (2) "Bird capturing Butterfly" (1917, xxix); (3) "Parasites and Hyperparasites of *Aphidae*" (1917, lv).

Dr. G. D. H. Carpenter: "Birds pursuing Butterfly" (1920, xxxiii).

The late Dr. T. A. Chapman, F.R.S.: "Cocoons of *D. vinula*" (1917, lxxi).

Dr. E. A. Cockayne, D.M., Balliol: "Pentatomid Bugs devouring *Lycaenid* Butterfly" (1915, cxix).

J. Collins: (1) "Black var. of Oxford Beetle" (1921, cvi); (2) "Chalcid Parasites bred from Beetles" (1922, xix).

H. St. J. K. Donisthorpe: (1) "Hyperparasite of Parasite of *Pierine* larva" (1917, xlvi); (2) "*A. euphrosyne* retaining pupal head-sheath, captured in coitu" (1921, lxviii).

Dr. H. Eltringham, D.Sc.: "Scent-organs of *Hydroptila*," with pl. XXII (1919, p. 420; 1919, l).

A. H. Hamm, F.E.S., with H. Britten: "The Habits of a *Mymarid*" (1917, lxxxiv).

A. H. Hamm: (1) "A Chalcid bred from Hawthorn Seeds" (1922, xviii); (2) "The Life-history of a *Bethylid*" (1922, xxvi); (3) "Notes on Oxford *Trypetid* Flies" (E. M. M., Apr. 1918, p. 87); (4) "A Dipterous Mimic of Saw-flies" (1920, xxxii); (5) "A Ribbon-making Fly" (E. M. M., Mar. 1919, p. 66); (6) "The Horse Bot-fly" (E. M. M., Oct. 1919, p. 229); (7) "Irregular Colour-response of *Pierine* pupae" (1921, xxviii); (8) "*H. phlaeas* injured, probably by bird" (1921, li); (9) "A *Capsid* Bug devouring a *Pierine*" (1915, cxix).

A. H. Hamm, with Dr. R. C. L. Perkins, F.R.S.: "The 3rd Brood of *H. phlaeas* in 1921" (1921, cvi).

Col. T. Jermyn: "*Ammophila sabulosa* with Abnormal Venation" (1917, xiii).

W. J. Lucas: "The Preferences of a Wasp" (1922, ci).

The late Prof. Raphael Meldola, Hon. D.Sc., F.R.S., with the Professor: "Notes in 1893 on Insects visiting the *Primrose*" (1922, lxxxiv). Further notes by J. Collins and A. H. Hamm (lxxxv-lxxxvi).

Mrs. Raphael Meldola: "Remarkable var. of the Moth *M. fluctuata* taken near Dunbar, Aug. 12, 1912": exhibited by Miss Balfour (1917, lxxvi).

Dr. R. C. L. Perkins, D.Sc., F.R.S., Jesus, with the Rev. F. D. Morice, M.A., Queen's, and A. H. Hamm: "Bees making Nests in Snail-shells" (1916, xxviii). Correction by Dr. G. Arnold (1918, xl).

Dr. R. C. L. Perkins: (1) "Giantism in Male Bees" (1918, lxxvii); (2) "*Polistes gallica* in England" (1918, lxxvii); (3) "Certain Bees of genus *Andrena*" (1921, xxvii); (4) "The Pairing of *Stylops*" (1918, lxx, with pl. A); (5) "Seasonal Forms of *Pararge aegeria*" (1918, lx); (6) "The Comma Butterfly at Rest" (1922, xix); (7) "Seasonal Forms of *A. bellargus*" (1922, lxxiv). Dr. G. G. C. Hodgson's notes on the same subject; (8) "Insect Food of the Trout" (1921, lxxiv).

Prof. E. B. Poulton: (1) "*Musca autumnalis* (corvina) hibernating in loft in I. of Wight" (1915, xxi; 1918, xxii; 1920, ii; 1921, vii); (2) "Life-history of Moth, *U. Sambucaria*" (1919, xxxiv); (3) "Adaptive Colour-changes in Larva of Moth, *S. ocellatus*" (1920, lxxviii); (4) "A Bird capturing Butterfly (1917, xxix) and Dragon-fly" (1921, xxix); (5) "Chalcid Parasite waiting to attack Butterfly Pupa" (1917, lvi); (6) "Spider probably protected against attack" (1919, lxxviii); (7) "Queen Wasp and its Dipterous Prey" (1919, lxxviii); (8) "Experimental Evidence for Hereditary Transmission of Small Variations" (Rep. Brit. Assoc., 1922, p. 372).

P. C. Reid: "A Californian Plume-moth taken in Scotland" (1919, vi).

The late G. A. James Rothney, F.E.S.: "*Polistes gallica* in England" (1918, lxvi).

The Rt. Hon. Lord Rothschild, F.R.S.: "Pap. machaon with symmetrical injuries, bred at Tring" (1922, li).

Commander J. J. Walker, Hon. M.A., R.N.: "Oxford Butterflies" (E. M. M., Nov. 1918, p. 246).

Commander J. J. Walker, with A. H. Hamm: "Notes on the Comma Butterfly" (1922, xx, lxx); Dr. Perkins's comments (1922, lxx).

Commander J. J. Walker: "Fifth Supplement to list of Oxford Coleoptera" (Rep. Ashmol. Nat. Hist. Soc., 1920, p. 23).

F. C. Woodforde, B.A., F.E.S., Exeter College: (1) "On Vars. of British Lepidoptera" (1915, xlv; 1920, xxxii); (2) "Notes on the British Macro-Lepidoptera in the Hope Dept." (Entomologist, 1920, July, p. 152, Aug., p. 173, Sept., p. 199, Nov., p. 257; 1921, Jan., p. 8, April, p. 90, June, p. 140, July, p. 161, Dec., p. 285; 1922, Jan., p. 12); (3) "Ophion Parasite bred from Pupa of Moth, *B. quercus*" (1920, iii).

General.

R. S. Bagnall, F.L.S.: (1) "Brief Descriptions of New Thysanoptera, V (Ann. Mag. Nat. Hist., March, 1915, p. 315); (2) Ditto VI (ibid., June, 1915, p. 588); (3) Ditto VII (ibid., March, 1916, p. 213); (4) Ditto VIII (ibid., May, 1916, p. 397).

The late Dr. T. A. Chapman, F.R.S.: "Germinal 'Factors' and Evolution" (1922, viii).

Dr. E. A. Cockayne, M.A., D.M., Balliol, and the Professor: "Fluorescent Pigments and the Evolution of Butterfly Mimicry" (1921, xcix).

Dr. F. A. Dixey, M.A., D.M., F.R.S.: (1) "New Pierinae," with pls. I-II (1915, p. 1; 1914, lvi); (2) "A Voyage to Australia, Ceylon, and the Malay Archipelago in 1914" (E. M. M., 1916, Jan., p. 10, Feb., p. 46, March, p. 49, May, p. 119, June, p. 121); (3) "Notes on the Insects collected on the above Voyage, especially on the Scents of Male Butterflies" (1916, lviii); (4) "Seasonal Dimorphism" (Proc. S. Lond. Ent. and Nat. Hist. Soc., 1916-17, p. 1); (5) "Seasonal Dimorphism in Scent-scales of Male Butterflies" (1920, xiii).

Alan P. Dodd: "Proctotrupidae" (1919, p. 321, xl).

Dr. H. Eltringham, M.A., D.Sc., New College: (1) "Butterfly Vision," with pls. I-V (1919, p. 1; 1918, clxxxvii); (2) "Tympanic Organ of certain Moths" (1922, xc); (3) "Methods for Microscopical Research" (1915, ii; 1916, iii).

Katharine Foot and the late E. C. Strobell: "Results of Crossing two Hemipterous Species," with pls. 41-7 (Linn. Soc. Journ., Zool., Sept. 1915, p. 457). Structural Details investigated by Dr. Eltringham.

The late Col. Neville Manders, R.A.M.C.: "Criticism of Theories of Mimicry" (1915, xxiii). Preceded by "The First Statement of Müllerian Mimicry" (1878), translated by E. A. Elliott, F.Z.S. (xxii); succeeding Discussion by the Professor (xxx), C. F. M. Swynnerton (xxxii), Rev. G. Wheeler, Dr. S. A. Neave (xliii), and Dr. Carpenter (1918, xciii). Reply to the Professor by Col. Manders (1916, lxiv).

Rev. F. D. Morice, M.A., Queen's: "New Chrysidids" (1916, p. 264).

Dr. Th. Mortensen, Zool. Mus., Copenhagen: "'False Heads' of Lycaenid Butterflies" (1918, xliv; 1919, xi). Also on same Dr. Perkins, F.R.S. (1918, xlvi; 1919, xi), the late Dr. Chapman, F.R.S. (1918, xlvi), the Professor (1918, xlvii) Dr. Neave (1918, xlviii), C. F. M. Swynnerton (1918, xlix), and G. T. Bethune-Baker (1918, l). See also Sibree (1917, lxv) and Dr. Van Someren (below).

Prof. E. B. Poulton: (1) "A Remarkable American Work on Evolution, &c.," Pres. Addresses to Linn. Soc., Lond., 1913 and 1914 (Proc., 1912-13, p. 26; 1913-14, p. 23); (2) "Hereditary Transmission of Small Variations and Origin of Butterfly Mimicry," with pl. I, Pres. Address to Linn. Soc., Lond., 1916 (Proc., 1915-16, p. 21); (3) "The Inspiration of the Unknown," Pres. Address to S.E. Union of Sci. Socs., Reading, June 8, 1921 (Trans., S.E. Union, 1921, p. 1); (4) "The Migration of Lepidoptera" (1921, xii). Also on same Commander J. J. Walker (xv) and Major W. le M. Pendlebury, F.E.S. (xvi); (5) "Recent Discoveries in Butterfly Mimicry of Ethiopian and Nearctic Regions" (Proc. Linn. Soc., Lond., Nov. 1917-June, 1918, p. 10).

Capt. N. D. Riley, F.E.S.: "Butterflies of the 1921 Everest Expedition," with pls. XXXVI, XXXVII (1922, p. 461, xvii, lxxvii). Mr. G. H. Bullock's interesting captures are described.

Dr. V. G. L. Van Someren: "'False Heads' of E. African Lycaenid Butterflies" (1922, xlix, c). Comments by the Professor (xlix).

Commander J. J. Walker, Hon. M.A., R.N.: (1) "Fringes of Butterfly Life," Pres. Address to Ent. Soc., Lond., Jan. 21,

1920, with map (1919, lxxxix); (2) "Distribution of *Danaida plexippus*," with map (E. M. M., 1914, July, p. 181, Aug., p. 185, Sept., p. 224, Oct., p. 233).

C. B. Williams, M.A., Ministry of Agriculture, Cairo: "Special Attacks of Bloodsucking Diptera upon New-comers into the Tropics" (1918, clxxiv). Experience of many Entomologists recorded (clxxvi).

ADDITIONS TO THE COLLECTIONS.

Many gifts and bequests of entire collections, valuable books, &c., have been made to the Department since 1914.

The fine collection of insects, chiefly butterflies, from Sierra Leone, made by the late Lt. C. A. Foster, Worc. Regt., was presented by his father in 1914. This collection is a very important addition to the W. African species in the Department.

The large collection of N. Indian moths made by the late Maj.-Gen. J. G. Pilcher, I.M.S., was presented in 1917 by Mrs. Pilcher. The insects are contained in 120 large store-boxes fitting the shelves of a glazed wall-case. The carriage, which required great care, was successfully effected in this, as with the succeeding collections and cabinets, by road transport.

The late G. A. James Rothney, F.E.S., a generous friend to the Department for many years, bequeathed £50, in order to provide a cabinet for Oriental Hymenoptera, and made arrangements for the binding of his Trans. Ent. Soc., in the Hope Library, up to the end of 1922. An account of his many gifts will be found in earlier Reports and in the brief Obituary in Ent. Monthly Mag., 1922, p. 113.

The succeeding nine bequests and donations contain important additions to the British collections, the insects of the last five being entirely British.

The interesting and varied collection of Lepidoptera made by the late Rev. J. W. B. Bell, M.A., was presented, together with its cabinets, by Mrs. Bell in 1920. It includes an interesting series of British Lepidoptera collected in the neighbourhood of Pyrton, Oxfordshire. The majority of the exotic species were collected by G. Vernon Bell in the

Federated Malay States, and it is hoped that data will be available for labelling them, on his return to this country.

A large part of the valuable collection of Coleoptera belonging to the late Mr. H. E. Cox was presented by Mrs. Cox in 1915, the remainder in 1922. It included the British collection upon which his well-known book was founded, a large general collection and a special collection devoted to the Heteromera. This latter included the Heteromera of the W. W. Saunders Collection in the original Standish store-boxes, a very interesting accession. With the specimens were some excellent cabinets and many valuable books.

The Octavius Pickard-Cambridge Collection and Library of Arachnology were bequeathed to the University in 1917.

Mr. A. W. Pickard-Cambridge, M.A., Balliol, kindly helped in the arrangement of the specimens and catalogued the splendid library with its great series of separata. Arrangements were fortunately made for binding all these papers before prices had risen to a prohibitive level. It is hoped that, in accordance with the wishes of the testator, a printed catalogue, postponed for financial reasons, will be prepared and issued. The specimens occupy the original shelves and cases, to which doors have been added. This famous collection is one of the most important bequests ever received by the Hope Department.

The very fine collection of European Lepidoptera, including the collection of the late Rev. F. E. Lowe, together with a large number of valuable books, was bequeathed to the Department in 1922 by the late H. Rowland-Brown, M.A., University. The collections, contained in fifteen cabinets, will be of the greatest value to students. Eight specimens of the extinct "Large Copper" butterfly are included—six of them in perfect condition. A fine microscope, bequeathed to the testator by the late Sir William S. Gilbert, was presented to the Department by Miss Rowland-Brown in accordance with her brother's wishes.

The British collections of Lepidoptera and Hymenoptera made by the late Lieut. R. J. Champion, Jesus, killed in the war, were presented by his parents in 1919. They include

a large number of species much wanted by the Department because of their localities; also some extremely fine varieties.

The late Prof. W. M. Geldart's fine collection of British Lepidoptera was presented in 1922 by Mrs. Geldart, together with the cabinets and many valuable books. Large numbers of specimens are much wanted because of their rarity or on account of locality.

A collection of Lepidoptera taken in the Morte-hoe district was bequeathed in 1921 by the late Dr. G. B. Longstaff, a generous benefactor of the Department for many years (Ent. Monthly Mag., 1921, p. 157). The bequest included the cabinet, a quantity of collector's material, and a large number of valuable books, including some very fine atlases.

The fine collection of British Lepidoptera made by the late Prof. Raphael Meldola, F.R.S., was bequeathed to the Department in 1915, with the cabinets and a large number of valuable books for the library. Among the many treasures is a remarkable and unique variety of the Geometrid moth *M. fluctuata*, taken by Mrs. Meldola near Dunbar.

The fine collection of British Lepidoptera made by the late Arthur Sidgwick, M.A., C.C.C., was presented, with its cabinets, by Mrs. Sidgwick in 1921. The most remarkable insect is *Cucullia lactucae*, bred at Oxford—a moth new to Great Britain.

If space had permitted a number of rare and interesting species in all these collections might have been mentioned. Specimens of which the University Collection already possesses a sufficient number are being distributed in directions which will help on the study of Entomology, while some are exchanged for others required by the Department.

The Hope Department includes the British collections other than Arthropoda. In 1920 it received from F. C. Woodforde, B.A., F.E.S., Exeter, the gift of the fine collection of birds made by his father, Dr. F. H. Woodforde, M.D., Edin. Nearly all the species, some of which are excessively rare, were obtained in Somerset and Devon.

In addition to the above accessions, Dr. Malcolm Burr's

important collection of Palaearctic Orthoptera, with its cabinets, was purchased by the University for the Department, in 1922.

The following list of accessions in the years 1915-22 is very incomplete and the account of many of them very inadequate. It is hoped that in future Reports brief mention may be made of the most important omissions.

The accessions are here arranged in the order of the donors' names and not grouped under the Zoological Regions. The accessions which are entirely or principally British are, however, placed together at the end.

An asterisk is added to the name of the donor when his gift has been, in whole or in part, the subject of a published paper. Nearly all such papers are quoted in the list of publications on pages 681-685.

H. E. Andrews, F.E.S.: A valuable series of Coleoptera, with co-types of many new species.

H. Leslie Andrewes: Lepidoptera from Dar-es-Salaam and Lumbwa, near W. lip of the Rift Valley, Kenya Colony. Many species are much wanted and all for the sake of locality.

Dr. G. Arnold, D.Sc., Curator of the Bulawayo Museum: A valuable series of S. African ants.

G. T. Bethune-Baker, F.E.S.: Ethiopian butterflies much wanted by the Department.

British Museum (Natural History): An important addition to the collection of "Apollo butterflies" (*Parnassius*) was received in exchange.

*G. H. Bullock, M.A., New College: Very interesting series of Lepidoptera, chiefly butterflies, from Fernando Po, Peru, and the 1921 Everest Expedition.

*Dr. G. D. H. Carpenter, D.M.: Many papers have been written upon the splendid African collections, chiefly from Uganda and Tanganyika Territory, but mention must be made of the discovery of a new mimetic form of *Pseudacraea poggei* from the latter area. The typical butterfly, long known as one of the best mimics of *Danaiida chrysippus*, is now shown to be accompanied by a form mimicking the *dorippus* form of its model, common in E. Africa. Another

astonishing discovery is that of a race of the well-known British "Small Copper" butterfly in the extreme S.W. of Uganda and southward to the N. end of L. Tanganyika.

H. G. Champion, B.A., New College: Lepidoptera from W. Almora, U.P., India.

*E. C. Chubb, Curator of the Durban Museum: Dimorphic E. African Flatidae (Homoptera).

B. Preston Clark: A valuable series of Hawkmoths (*Sphingidae*) was received in exchange. Several co-types of American species are included.

*Prof. T. D. A. Cockerell, University of Colorado: N. American butterflies; also an interesting variety of *Pyrameis cardui* from Porto Santo.

O. G. S. Crawford: A small but very interesting collection of insects from the Blue Nile.

W. M. Crawford: Butterflies from Orissa, N.E. India, an interesting and little known locality.

*Dr. F. A. Dixey, M.A., D.M., F.R.S., Wadham: An interesting and varied series of insects, illustrating many records of observation, taken on the voyage from Australia in 1914, and in 1922 at Lisbon and in Madeira, Tenerife, and Grand Canary.

*F. P. Dodd, F.E.S.: N. Australian insects of various groups, illustrating many interesting observations.

Col. C. Donovan: A fine series of Indian butterflies; also moths from the Faringdon district for the British Collection.

Capt. A. F. Evetts: A fine collection of Lepidoptera from Balehonnur, W. Ghats, Mysore Pr., containing new species and many of which the geographical distribution is of much interest.

R. W. Farmborough: A valuable series of Lepidoptera from Trinidad. The specimens which had suffered greatly in transit were successfully repaired.

*The late C. O. Farquharson, M.A., B.Sc., Aberdeen: The S. Nigerian collections and observations of this fine naturalist, lost to science in the sinking of the *Burutu*, in 1918, are fully described and illustrated in Trans. Ent. Soc., 1921 (pp. 319-531).

*W. Feather, F.E.S.: A fine collection of Somaliland moths with many new species; also colour-vars. of an *Ityraca* (*Flatidae*), Kenya Colony.

*J. C. F. Fryer, M.A., F.E.S.: The whole of the material employed in the important "Investigation by Pedigree Breeding into the Polymorphism of *Papilio polytes*, Linn." (Phil. Trans. Roy. Soc., B., vol. 204, p. 227). The preparation and labelling of this large series occupied much time and labour. Much effort has also been expended in the attempt to study the proportions of the different female forms of this species in various parts of its range, and much kind help has been given by T. R. Bell, W. M. Crawford, F.E.S., Prof. T. Bainbrigge Fletcher, R.N., F.E.S., Mrs. D. R. Fyson, Dr. R. Hanitsch, Ph.D., J. Williams Hockin, F.E.S., C. M. Inglis, F.Z.S., F.E.S., and O. C. Ollenbach, F.E.S.

The late A. E. Gibbs, F.L.S.: Butterflies from British Honduras.

*Dr. R. Hanitsch, Ph.D., F.E.S., formerly Director of the Raffles Museum, Singapore: Interesting insects from Bukit Kutu, Selangor, F.M.S.; also a series of *Pap. polytes* from Singapore Is. and the mainland opposite.

*J. Williams Hockin, F.E.S.: A large and valuable series of butterflies and some other insects from Travancore—a locality very poorly represented in the Hope Department.

G. V. Hudson, F.E.S.: New Zealand Lepidoptera unfortunately much damaged in transit.

Dr. F. W. Jackson: Fine series of butterflies from Trinidad and other West Indian Islands.

*Col. Turenne Jermyn, F.E.S.: Indian butterflies, including interesting additions to the Mimicry series.

*J. J. Joicey, F.L.S., F.E.S., Hertford: Many species of butterflies especially wanted by the Department, some of them belonging to mimetic associations; from Africa, S. America, and the Austro-Malayan Islands. The latter include a fine set of *Delias* from New Guinea and a fine mimetic set from Tenimber Is. (Timor Laut).

W. J. Kaye, F.E.S.: South American butterflies greatly wanted by the Department.

*R. Kelly: A large and varied group of insects taken on one day visiting the flowers of a *Eucalyptus*: Healesville, Victoria.

Sir George Kenrick, F.E.S.: Pierine butterflies from New Guinea much wanted by the Department.

*W. A. Lamborn, F.E.S.: Extremely fine and varied series of insects from Tanganyika Territory and Nyasaland and from the Federated Malay States, accompanied by the most valuable notes. In addition to these, interesting collections made in China, Japan, and Canada on the journey home from F.M.S. Some of Mr. Lamborn's results have been recorded, but an immense body of material and observations remains to be worked out.

C. H. Lankester: Extremely interesting Costa Rican Tetti-goniidae (Locustidae) with wings resembling leaves eaten by a caterpillar.

Capt. A. L. Kent-Lemon: A fine series of Lepidoptera from the Nuba Hills and the S. Sudan—extremely interesting and little-known localities.

The late Dr. G. B. Longstaff, M.A., D.M., F.R.C.P., New College: Collections of varied insects taken, with excellent records of observations, on yearly journeys—the last to Spain in 1920, about a year before the death of the donor. The original note-books are a most valuable accession.

Dr. and Mrs. A. C. Lorena: Butterflies from the Gold Coast, a part of the Ethiopian region not well represented in the Department.

*A. Loveridge, F.E.S.: The material of interesting observations on the habits of East African "Driver Ants".

*Lt. L. H. Mosse-Robinson, R.N.: A fine set of Australian insects, chiefly moths; also Lepidoptera from Fiji, Ceylon, &c.

Major J. C. Moulton, M.A., B.Sc., Magdalen, Director of the Raffles Museum, Singapore: Malayan butterflies.

*O. C. Ollenbach, F.E.S.: A fine series of N. Indian butterflies.

W. Ormiston, F.E.S.: About 84 species of Ceylon butterflies, with excellent data.

*Oxford University Spitzbergen Expedition: An interesting

series of Arthropoda from Spitzbergen and Bear Is., described by the following authorities :—Prof. G. H. Carpenter, D.Sc., and Miss K. C. Joyce Phillips : Collembola (R. I. A., vol. xxxvi, B., p. 11); J. E. Collin, F.E.S. : Diptera—Orthorrhapha Brachycera and Cyclorrhapha (Ann. Mag. N. H., Jan. 1923, p. 116); F. W. Edwards, F.E.S. : Diptera Nematocera (ibid., Aug. 1922, p. 193); Rev. J. E. Hull, M.A. : Acari (ibid., Dec. 1921, p. 621); Dr. A. Randell Jackson : Spiders (ibid., Feb. 1922, p. 163); Rev. F. D. Morice, M.A., Queen's : Saw-flies (ibid., Aug. 1922, p. 219); Dr. J. Waterston, B.D., D.Sc. : (1) Hymenoptera Parasitica—Ichneumonoidea (ibid., Jan. 1923, p. 31); (2) Mallophaga (Trans. Ent. Soc., 1922, p. 251).

M. A. Pallis, F.E.S. : An interesting and varied collection of Lepidoptera from many localities.

Paris Museum : A male of *Papilio humbloti*, Comoro Islands, much wanted by the Department.

*Dr. R. C. L. Perkins, M.A., D.Sc., F.R.S., Jesus College : An exceedingly fine collection of Hawaiian insects, of the highest interest, especially as examples of geographical distribution. Also a bred series of *Pararge aegeria* demonstrating the cause of the difference between the two early broods of this species in England; an interesting series of insects, including 46 species of beetles, from the stomach of a trout of about $\frac{3}{4}$ lb. weight, taken in the Torquay reservoir on the edge of Dartmoor (1920); a bee (*Osmia*) and its nest in a snail-shell and covered with pine-needles.

H. C. Robinson, F.E.S., Director of the F.M.S. Museum, Kuala Lumpur : An interesting series of F.M.S. butterflies injured by the attacks of enemies.

*The Rev. Canon K. St. Aubyn Rogers, M.A., Wadham : Extremely fine collections of butterflies and some moths from Kenya Colony, Tanganyika Territory, and S. Africa. Several new species and interesting geographical races are included, and from Nairobi many wonderful forms of that most interesting of all known butterflies *Papilio dardanus*.

*The late G. A. James Rothney, F.E.S. : Several important collections, chiefly of Aculeate Hymenoptera, from India,

Australia, W. Africa, and S. America. The Indian series includes 1,320 Aculeates (621 bees) from Col. C. G. Nurse's collection, kindly selected by Prof. T. D. A. Cockerell. In addition to the above, two historic collections of Hymenoptera, formerly in the possession of Edward Saunders, F.R.S., and Francis Walker.

*A. R. Sanderson, F.L.S.: A most interesting series of butterflies (*Delias*) and mimetic moths migrating together, in one direction in the evening and the opposite direction in the morning, over a pass at Bukit Kutu, Selangor, F.M.S. (about 3,500 ft.), in March, 1920. Mr. T. R. Harvey captured some of the specimens and kindly presented them.

*H. W. Simmonds, F.E.S.: The Fijian Insects, chiefly butterflies, received 1919-22, from various islands of the group, and from Wallis and Fotuna Is. between Fiji and Samoa have been of the greatest interest, and throw a strong light upon the growth of mimetic likenesses. A remarkable and surprising result obtained by Mr. Simmonds is the breeding of all-female families of *Hypolimnys bolina* as well as the widely different female forms which appeared in the same family. Much has still to be published upon this fine material.

*C. F. M. Swynnerton, Game Warden of Tanganyika Territory: Insects, especially Lepidoptera from S.E. Rhodesia and a few from Tanganyika Territory. The specimens illustrate bionomic or genetic researches of great interest.

R. J. Tillyard, M.A., D.Sc., Chief of the Biol. Dept., Cawthron Inst. of Sci. Res., New Zealand: Very interesting and primitive New Zealand moths.

Rupert Vallentin: Insects from Falkland Islands, with the cabinet containing them. A most interesting collection, including long series of many moths.

Commander J. J. Walker, Hon. M.A., R.N.: Among many gifts, a fine set of Coleoptera from New Zealand, arranged by the donor and kept as a separate collection; also a large number of insects, especially Lepidoptera, from many localities and with admirable data, including a fine series of *H. bolina* and *Euplocac* from Polynesia.

Colin R. Walker: Lepidoptera from N. Nigerian localities unrepresented in the Department.

*J. H. Watson, F.E.S.: Saturnian moths with their cocoons, 4 examples of *H. bolina* from Fanning Is.

C. A. Wiggins, C.M.G., late P.M.O. of Uganda: Fine additions to the splendid Uganda collections of insects presented in earlier years: also large collections abandoned during the war.

*C. B. Williams, M.A., Ministry of Agric., Cairo: Insects of varied groups illustrating observations in tropical America.

*Lieut.-Col. R. S. Wilson, F.E.S.: A very fine collection of insects, chiefly butterflies, from the Nuba Mountains Province of the Sudan, with admirably detailed geographical and meteorological data. Also a fine series from the Western Desert Province of Egypt.

F. C. Woodforde, B.A., F.E.S., Exeter: A fine series of Lepidoptera with excellent data collected by the donor in E. France in the summers of 1920-22, inclusive.

The following accessions are entirely or mainly additions to the British collections.

The Rev. C. R. N. Burrows: Species of *Hydroecia* determined by donor, and the preserved larva of *H. crinanensis*.

H. H. Corbett: The rare Hemipteron *Aphelocheirus aestivalis*, R. Idle, Scrooby: Notts. (1919).

H. St. J. K. Donisthorpe, F.E.S.: Continued additions to the collection of Coleoptera for which he has done so much for so many years. the number of species presented being 1,970 out of about 3,200 known in Great Britain. Also many British insects of bionomic interest, ants, and a few other insects from various parts of the world.

The Rev. H. D. Ford and E. B. Ford, Wadham: Cumberland Lepidoptera.

T. H. L. Grosvenor, F.E.S.: A black var. of *Zygaena trifolii*, Sussex (1921).

*W. J. Lucas, F.E.S.: Insects for the British collections and bionomic series.

F. C. Woodforde, B.A., F.E.S., Exeter: The kind and most efficient help of previous years has been continued over

the whole period under review. Mr. Woodforde has also, as before, enlisted the help of his friends, E. D. Bostock, F.E.S., A. E. Burras, F.E.S., B. H. Crabtree, F.E.S., C. F. Johnson, F.E.S., and J. W. Peed, M.A., F.E.S., who have contributed valuable material to the collection of British Lepidoptera.

THE HOPE LIBRARY.

Some account of the great increase in the Departmental Library must be postponed for a future Report. The most important accessions have, however, been briefly mentioned in the list of bequests and donations. To these must be added one of the most interesting—the gift in 1915 by Mr. T. H. Riches of a large part of the library of Alfred Russel Wallace, the other part having been presented to the Linnean Society.

Since 1914 it has only been possible to secure temporary assistance in the library. Thus for two years Dr. Hanitsch gave most valuable help in cataloguing and the preparation of a hand-list. The establishment of a permanent Librarian-ship is one of the greatest, if not the greatest, need of the Hope Department.

E. B. POULTON

Report of the Hope Professor of Zoology, 1923.

The accessions in the years 1915-1922 as also in 1923 are still imperfectly acknowledged, but gradual progress is being made. The work of the Department and the generous help received from many naturalists may, to some extent, be inferred from the lists of publications and accessions as well as other statements in this Report.

The Collection of Pierinae.

Dr. Dixey has named and incorporated the accessions from many parts of the world, and has written the papers upon Pierinae which are quoted in the list of publications. Some of the most difficult determinations have involved a microscopic examination of the male scent-scales.

A great part of Dr. Dixey's time in 1923 was occupied with two investigations, still incomplete: (1) The inter-relations of the species of the genus *Belenois*. (2) (In concert with Dr. Eltringham) the intimate structure of the scent-distributing apparatus in the Pierinae.

Both of these involve elaborate microscopic work.

The British Collections.

The British collections, especially of Macro-Lepidoptera, have become of much greater importance and are far more generally consulted than formerly, in consequence of the increasing interest in Entomology among the students during recent years. The great size of the collections may be inferred from the numbers of British moths in the following groups, counted within the last six months by Mr. F. C. Woodforde: Sphingidae, 562; Noctuidae, 16,164; Geometridae, 14,162. These numbers do not include some thousands of specimens without geographical data. Mr. Woodforde hopes to count the remaining groups during the autumn.

Within the limited compass of the British Islands interesting changes can be witnessed in many of the species as they are followed from one set of localities to another; and thus the

collection forms an excellent introduction to the important study of geographical races in general.

The accessions, which have been very large, are mainly due, as in previous years, to the kind help of Mr. Woodforde and the friends he has interested in the Department.

An important piece of work accomplished during the year is the labelling and incorporation of Lepidoptera from the Geldart Collection. The 1,850 specimens, including 619 Geometridae, represent a large number of British localities with many Scottish, Irish, and Welsh. Many specimens not wanted in the University Collection have been distributed, as the late Prof. Geldart would have wished, among members of the Oxford University Entomological Society.

Mr. H. St. J. K. Donisthorpe, F.E.S., has continued his kind assistance to the collection of British Coleoptera, the number of species presented by him, all with the most excellent data, amounting to 2,017 out of about 3,500 known to inhabit Great Britain. He has also presented many British insects of much bionomic interest.

Visits of Naturalists.

Many naturalists have visited the Hope Department in order to study the parts of the University Collection bearing upon their own work: Dr. Karel Absolon, of the Museum, Brno, Czechoslovakia—Orthoptera; Mr. H. E. Andrewes—Oriental Carabidae; Mr. G. T. Bethune-Baker—Lycaenidae; Mr. G. H. Bullock—in relation to his departure for Abyssinia; Dr. P. A. Buxton and Mr. C. L. Collenette—in relation to their departure for the Pacific; Dr. G. D. Hale Carpenter—insect bionomics in Uganda, &c.; Mr. G. C. Champion—Coleoptera; Mr. H. St. J. K. Donisthorpe—British Coleoptera and ants; Prof. R. Goldschmidt—all-female families of Lepidoptera and gynandromorphs; Mr. Arthur F. Griffith—British Lepidoptera; Mrs. M. D. Haviland-Brindley—Membracidae; Mr. W. J. Kaye and Sir Norman Lamont—Trinidad Lepidoptera; Dr. J. C. Mottram—problems of insect coloration; Mr. A. Loveridge—insect bionomics of E. Africa;

Mr. A. W. J. Pomeroy—insect bionomics in S. Nigeria; Mr. Louis B. Prout—Geometridae; Mr. C. B. Williams—life-history of an Egyptian Nemopterid. Nearly all of these have given valuable assistance in the working out of the collections, have added much-needed specimens, or expressed the intention of sending material.

Mr. Bethune-Baker and Mr. Kaye have read papers before the Oxford University Entomological Society.

The Department has also been visited by many who have contributed valuable specimens—by Mr. R. W. Farnborough, Mr. J. C. F. Fryer, Mr. J. Williams Hockin, Dr. F. W. Jackson, Mr. R. Livesey, Mr. R. H. Thomas, and the Rev. J. U. Yonge.

Fund for the Study of Social and Organic Evolution.

The abundant illustrations of the Professor's Memoir on "Mimicry in the Butterflies of Fiji" (Trans. Ent. Soc., 1923, p. 564)—twenty-four plates, of which nine are coloured—were provided from the fund presented by Prof. J. M. Baldwin. Without this important help it would have been impossible to treat adequately the history of the evolutionary changes which have followed the waves of invasion into these islands and the associations which have been set up in them.

Further work upon the collection in the Semliki Valley, of which the expenses were defrayed by the Fund, has been published by Dr. G. D. H. Carpenter (Proc. Ent. Soc., 1923, p. lxii).

The Rev. F. C. R. Jourdain has not been able to finish his memoir on the colours of cuckoos' eggs, but it is hoped that the work will be ready for publication in the course of the present year.

Hope Reports.

Volumes X–XIII, inclusive, have been bound and the three earlier distributed to almost all the libraries and museums which receive them. The binding occupied a much longer time than had been anticipated and the appendix to Vol. X is still unbound. In the meantime the materials for Vol. XIV are rapidly accumulating.

Published work in 1923.

References such as "xlviii" indicate the page of the "Proceedings of the Entomological Society of London" for 1923; such as "469" the page of the "Transactions" of the same Society for 1923. The "Proceedings of the Zoological Society of London" are indicated by "P. Z. S.", the "Entomologist's Monthly Magazine" by "E. M. M." The papers concerned with the Ethiopian Region are placed together, leaving those concerned with other Regions and general subjects in a single group.

Ethiopian Region.

Dr. G. D. Hale Carpenter, M.A., D.M., F.E.S.: (1) "Notes on Uganda insects" (xlviii); (2) "Butterflies from the Semliki Valley, Western Uganda" (lxii); (3) "Pseudacraea eurytus and its models in Eastern Uganda", with pls. XXVI, XXVII, and map (469).

Dr. H. Eltringham, M.A., D.Sc., F.Z.S., New College: (1) with additional notes by E. N. Willmer, C.C.C., and C. B. Williams, M.A. "On the larva of *Pterocroce storeyi* With. (Nemopteridae)", with pl. XI (263); (2) "On the early stages of *Chrysiridia ripheus* Dru.", with pl. XXII (439).

Capt. W. A. Lamborn and the Professor: "An E. African gregarious spider (*Stegodyphus*) with its communal nest crowded with remains of male *Pierine* butterflies—*Mylothris rubricosta*" (xcii).

G. F. Leigh: "A monkey's meal of Lepidopterous larvae and pupae" (xxxix).

G. F. Leigh and the Professor: "*Cyrtophora citricola* (*Epeira opuntiae*), a spider from Réunion, &c., spinning egg-cocoons which are white on the flat under surface and green on the convex upper surface, facing the observer" (lxxxvii).

A. Loveridge, F.E.S., C.M.Z.S.: "Notes on E. African insects collected in 1915-1922" (P. Z. S., 1923, p. 1013).

E. E. Platt, F.E.S.: "A large family of *Hypolimnas* (*Euralia*) *dubia*, form *wahlbergi*, bred from a captured female of the same form at Durban" (lix).

The Professor: (1) "The series of *Heodes phlaeas pseudo-phlaeas* in the Tring Museum" (xxii); (2) "*Pararge maderakal*, an Ethiopian 'Wall Butterfly'" (xxv); (3) "A remarkable male of *Papilio dardanus* bred by Dr. V. G. L. van Someren at Nairobi" (xlvi).

Dr. V. G. L. van Someren, M.B.O.U., F.E.S.: (1) "A hawk attacking *Papilio rex*, at Nairobi" (lxi); (2) "A remarkable variety of the dry-season form of *Precis octavia sesamus*, from Nairobi" (lxi); (3) "Larval *Ascalaphidae* on lichen-covered bark, &c., at Nairobi" (lxi); (4) "The remarkable snake-like appearance of an Ethiopian *Sphinx*-larva in the terrifying attitude" (lxxix).

Lt. H. B. Waters: "A remarkable Lepidopterous leaf-mine from S. Nigeria" (liv).

C. L. Withycombe, M.Sc., Ph.D.: "An *Ascalaphid* larva, collected by Capt. W. A. Lamborn in Nyasaland" (xliii).

Other Zoological Regions, &c.

Major E. E. Austen, D.S.O., F.Z.S.: "A revision of the family *Pantophthalmidae* (Diptera), &c." (P. Z. S., 1923, p. 551, figs. 1-11). Includes a description of the Oxford material.

K. G. Blair, B.Sc., F.E.S., and Capt. K. S. Sandford, B.A. D.Phil., F.G.S., University College: "Fragments of beetles from a Pleistocene peat-bed at Wolvercote, near Oxford" (xv).

K. G. Blair: "Some Coleopterous remains from the peat-bed at Wolvercote, Oxfordshire" (558).

G. C. Champion, F.Z.S., A.L.S.: "Revision of the Malayan and Indian species of the Melyrid sub-family *Carphurinae* in the Oxford and British Museums" (Ann. Mag. Nat. Hist., XII, pt. 1, 1923, p. 1, pl. I).

Dr. F. A. Dixey, M.A., D.M., F.R.S., Wadham: (1) "A *Pierine* from Viti Levu, Fiji" (iv); (2) "Note on the scent of *Euchloe ausonia*, f. *egyptiaca*" (v); (3) "The disappearance of cryptic patterns during flight" (lxvii).

E. B. Ford, Wadham: (1) "Examples of *Heodes phlaeas phlaeas* from the Sahara, in the Tring Museum" (xxiv); (2) "The geographical races of *Heodes phlaeas* L.", with pl. LIV (692).

D. J. Gordon, Balliol: "Further evidence that the wings of Lepidoptera are sometimes attacked by caterpillars" (xiv).

A. H. Hamm, F.E.S.: "Colour-adjustment in the wild pupae of *Pieris rapae*" (vi).

Dr. R. Hanitsch, Ph.D.: (1) "On a collection of Malayan Blattidae from the Buitenzorg Museum, Java (Treubia, 1923, III, p. 197, figs. 1-8); (2) "Malayan Blattidae", Pt. II (Journ. Malayan Branch, Royal Asiatic Society, I, Dec. 1923, p. 393, pls. XII, XIII).

W. J. Kaye, F.E.S.: "The upper-surface patterns of butterflies seen from beneath in a floating flight", with comments by the Professor (xxxvii).

C. H. Lankester, F.E.S., and the Professor: "The leaf-like appearance of a Neotropical Tettigoniid (Locustid) and moth (Thyridiidae)" (lxxxiii).

Major J. C. Moulton, B.Sc., M.A.: "A small dragon-fly captured sixty miles from land" (vi).

Capt. H. M. Pendlebury, F.E.S.: "Further bionomic notes on Lepidoptera and other insects from the Federated Malay States, &c." (lxxiii).

The Professor, with Capt. H. M. Pendlebury and Capt. W. A. Lamborn: "Some striking examples of mimicry in butterflies from the Federated Malay States" (xxxi).

The Professor: (1) "Further observations in 1922 on the Protective Resemblance of *Polygonia c-album*, and the attacks of enemies on British Butterflies" (vii); (2) "Mimicry in the butterflies of Fiji considered in relation to the Euploeine and Danaine invasions of Polynesia and to the female forms of *Hypolimnas bolina* L., in the Pacific", with pls. XXIX-LIII (564); abstract (xlix); (3) "Recent advances and discoveries in Insect Mimicry" (Trans. S.E. Union Sci. Soc., 1923, p. 71); (4) "Experimental evidence that commensalism may be beneficial to Crustacea" (P. Z. S., 1922, p. 897).

Lord Rayleigh, M.A., Sc.D., F.R.S.: "The optical interpretation of the visibility of the upper- when looked at through the under-surface pattern of certain butterflies" (xl).

Capt. N. D. Riley, F.E.S. : "The Rhopalocera of the Mount Everest 1921 expedition", with pls. XXXVI, XXXVII (Trans. Ent. Soc., 1922, p. 461). Includes a description of the Oxford material presented by Mr. G. H. Bullock.

H. W. Simmonds, F.E.S. : "All-female families of *Hypolimnas bolina*, bred in Fiji" (ix).

Prof. H. H. Turner, M.A., D.Sc., F.R.S. : "On the numerical aspect of Reciprocal Mimicry (Diaposematic Resemblance)," with figs. 1-9 (667).

Commander J. J. Walker, Hon. M.A., F.L.S. : "Cucullia lactucae at Oxford" (E. M. M., 1923, p. 8).

A. E. Wileman, F.E.S. : "Salt from human perspiration probably dissolved and absorbed by a Lycaenid butterfly" (lxxxii).

F. C. Woodforde, B.A., Exeter, F.E.S. : "List of butterflies taken in the NW. corner of Haute Saône, E. France, 1921-22" (E. M. M., 1923, p. 61).

ADDITIONS TO THE COLLECTIONS.

The collection of Lepidoptera made in the Lagos district by the late Mrs. J. M. A. Denton and presented by Sir George Denton in 1919 should have been acknowledged in the Report for 1915-1922. Many specimens needed by the Department have been incorporated, and the remainder, with the approval of the Donor, presented to a school.

The important collection of Lepidoptera, made in various parts of the tropics by Rear-Admiral Edmund Bourke, was presented by him in 1923. The specimens, arranged geographically in nineteen cabinets, were safely conveyed by road transport from near Lyndhurst to Oxford in the autumn. Dr. Dixey is studying the W. African Pierines, Mr. W. J. Kaye Trinidad Lycaenidae; while Dr. Eltringham has recognized W. African *Acraeas* hitherto unrepresented in the Department. The collection also came in time to add to the material studied by the Professor for his paper in Trans. Ent. Soc., 1923, p. 564, the collections made in Fiji and

Samoa being especially valuable for this purpose. A hitherto unrecognized race of a Pacific *Euploea* (*E. helcita bourkei*) was described from the Samoan series, and descriptions of new forms will be published by Dr. Dixey and Mr. Kaye in the near future.

The abundant and interesting series of Lepidoptera from the Fiji group presented by Mr. H. W. Simmonds of the Agricultural Dept., Suva, and briefly acknowledged in the last Report, is now fully described and, for the most part, figured in the above-mentioned paper.

The important collection made (1922-23) in the New Hebrides and adjacent groups by Mr. J. R. Baker, B.A., New Coll., to be acknowledged in detail in a future Report, and that made by Commander Walker in the same and other islands, were of the greatest help for comparison with the Fijian species.

The interesting collection of Diptera made in Spitsbergen (1923) by Mr. C. S. Elton, B.A., New Coll., is being worked out by Mr. J. E. Collin and Mr. F. W. Edwards, who will publish accounts of their respective groups.

The splendid set of twelve families of *Papilio dardanus*, each with its female parent taken at Nairobi, bred in 1922 by Dr. V. G. L. van Someren, and two from the same locality bred by Canon K. St. Aubyn Rogers, M.A., F.E.S., Wadham, arrived in time to be exhibited at the meeting of the Genetic Society on June 16. It is hoped that a detailed account of them with coloured illustrations will be published in the near future. They throw much new light on the evolution of the protean female forms of this most interesting of all butterflies.

The following donations have been catalogued and incorporated. All were presented in 1923 except those of which the donor's name is preceded by another date.

The references to publications are as already described, except that for the Proc. and Trans. Ent. Soc. of other years than 1923 the date, but nothing else, is added to the page.

A. E. Burras: 13 butterflies and 29 moths from Névache, Hautes Alpes (Aug., 1923).

C. L. Collenette: Lycaenid butterfly (1922) and moth (1920) with injuries inflicted apparently by enemies: Singapore.

W. Feather, F.E.S.: 31 butterflies from Moa, NE. Tang. Terr. (1923), including 9 *Acraea equatorialis anaemia*, 3 *A. rabbiae*, and 4 *Ploctzia cerymice* (a Hesperid flying after sunset to the flowers of the Papaw); 4 moths from Gazi, Kenya Colony; 28 male *Papilio dardanus tibullus* from Kibwezi (Feb., 1923) for comparison with the lightly marked specimen sent in 1922 (lxxv).

1922. A. Loveridge: The material illustrating the raid by "Siafu" (Driver ants) at Kilosa, Tang. Terr., E. Africa (1922, xxxiii).

S. Maulik: Two species of Hispid beetles with similar pattern collected from the same grass by H. G. Champion, B.A., New College: Kumaon, U. P., India.

1922. Dr. V. G. L. van Someren: 15 Lycaenid butterflies injured by the attacks of Lizards: Mombasa, Kenya Colony (1920). The specimens figured in Journ. E. Africa and Uganda N. H. Soc., No. 17, 1922, p. 18. (See also 1922, xlix.)

1921, 1923. J. J. Walker, Hon. M.A., F.L.S.: 2 *Danaïda melittula*: Samoa (1884): captured by G. F. Mathew, R.N.; also, presented in 1921, 3 *Heodes phlaeas*: Malta (1893); 81 Euploeas, 2 Danaines, and 12 Pierines from the Torres and Banks Islands, the New Hebrides, Loyalties, and New Caledonia. A very valuable accession collected during the voyage of the "Ringarooma" in 1900.

E. G. R. Waters, M.A., Keble: a leaf mined by two moth larvae (probably *Nepticula* or *Lyonetia*): Ibadan, S. Nigeria. Collected 1923 by Lt. H. B. Waters, B.A., St. Edm. Hall. (liv, fig.)

The Rev. George Wheeler, M.A., Keble: 246 European butterflies (1901-14), nearly all from various Swiss localities. The collection includes 119 Erebias and 62 Melitaeas, and

is all the more welcome because the species of these two difficult groups have been determined by the donor. The data of the whole are detailed and precise.

1922, 1923. F. C. Woodforde, B.A., Exeter, F.E.S.: 33 butterflies, 120 moths, and 6 other insects: Passavant, Haute Saône, E. France (1923). The series includes among butterflies:—*Brenthis dia*; *Limenitis populi*, var.; pair of *Lycaena cyllarus* and of *Aporia crataegi*; *Lycaena icarus*, var.; *Colias hyale*, a female of the early brood (June 3); among moths:—*Stronia clathrata*, a fine dark var.; 10 *Leucania albipuncta* (at sugar); 8 *Cloantha perspicillaris* (at sugar); 2 *Hadena atriplicis*; 1 *Heliothis dipsacca*, bred from 1922 larva, 1 captured specimen with evidence of attack by a natural enemy. Also, presented in 1922, 266 butterflies, 262 moths, 79 other insects, and 24 specimens for the bionomic series: Passavant (1922). The butterflies include 5 *Erebia medusa*, 9 *E. aethiops*, 1 fine var. *P. c-album*, 5 *L. camilla*, 10 *Apatura ilia*, 1 *Argynnis clodoxa*, a fine series of Melitaeas, many *Thecla ilicis*, 2 female *Cupido alcon*, many *Carcharodus alceae*, 2 var. *taras* of *Hesperia malvae*. (E. M. M., 1923, p. 61).

Additions to the Collection of British Lepidoptera.

Rev. C. Ash: 40 Lepidoptera from various localities in Yorkshire (1921–22).

E. D. Bostock, F.E.S.: 15 moths from the Cambridge district, including 4 *Arsilonche (Simyra) albovenosa* (Wicken Fen: Aug., 1914) and 4 *Eremobia ochroleuca* (Reach: Aug., 1914).

B. H. Crabtree, F.E.S.: 29 butterflies and 221 moths, including 4 *Crymodes exulis* (Shetland: 1909–18); 3 *Trochilium ichneumoniforme*, 6 *T. chrysidiforme*, 2 *T. culiciforme* (Folkestone: 1912–14); 1 fine ♂ *Herse convolvuli* (Carnforth, Lancs.: 1901); 2 yellow vars. ♂ *Odonestis potatoria* (Cambridge fens); 3 var. *hospita* of *Nemeophila plantaginis* from 3 localities; 6 *Palimpsestis fluctuosa* from 5 English localities; 2 *Leucania albipuncta* (Sandown, I.W.); 2 *L. favicolor* (Harwich district); 8 *L. elymi* (Lincolnshire coast); 1 *Tapi-*

nostola extrema (Huntingdon); 4 *Agrotis praecox* (Lancs.); 2 *Dianthoecia caesia* (I. of Man); 4 *Polia chi*, var. *olivacea* (2 Yorks., 2 Durham); 2 *Hecatera chrysozona* (Durham and Colchester); 6 *Hadena glauca* (Sutton Park, Birmingham, and Cannock Chase); 6 *Taeniocampa opima* (bred Wallasey); 2 *Xylina semibrunnea* (Cambridge); 4 *Acidalia contiguaria* (Penmaenniawr); 2 *A. humiliata* (I. of Wight); 4 *Thera simulata* (Scottish and Irish).

In addition to this fine accession to the British Lepidoptera the following have also been presented by the same generous donor: 77 moths from various localities, including I. of Man (1895). Among the species are 5 *Hadena contigua*, 17 *H. suasa*, 3 *Hecatera dysodea*, 6 *Cabera pusaria*, var. *rotundaria*, 10 *Gnophos obscurata* (Sussex).

Col. C. Donovan: 1 *Taeniocampa incerta*; Faringdon.

E. B. Ford, Wadham: 28 moths; Thursby, Cumberland.

D. J. Gordon, Balliol: 7 examples, including 3 species, of *Taeniocampa*; Strathpeffer.

F. Ll. Griffith: 7 moths; Sutherlandshire (1923).

C. F. Johnson, F.E.S.: 16 butterflies and 115 moths, including 1 *Leucania obsoleta* (Cambridge: 1907); 6 *Senta maritima* (Cambridge and Sandown, I.W.); 2 *Mamestra abjecta* (Harwich district); 1 dark var. *Arctia caja* (bred Cheshire: 1920); fine vars. of *Smerinthus populi* (9 bred Lancashire, 1 bred Cheshire); 6 *Eupithecia jasionata* (2 bred Cornwall: 1912, 4 Devon: 1915).

Received in exchange from P. P. Milman: 12 moths, including a hybrid between *Clostera reclusa* and *C. curtula*, bred Aug. 1918 from parents taken in Abbot's Wood, Sussex; 1 *Leucania vitellina*, 2 *Calocampa vetusta* (Paignton: 1920 and 1909); 2 *C. vetusta* (Merthyr: 1906); 1 *Anaitis plagiata* (Argyll: 1921).

Purchased from the Prest sale, Dec. 11, 1923: 161 rare moths much needed by the British coll. The series includes *Hydrilla palustris*, *Sphinx pinastri*, *Zygaena achilleae*, *Acosmetia caliginosa*, *Ino globulariae*, *Drepana sicula*.

*Other British Insects : specimens illustrating Life-histories,
Bionomics, &c.*

J. Collins : Male of the Halticid beetle *Phyllotreta diademata* with abnormal tarsi on one foot : Kirtlington (1915). To be described by Dr. E. A. Cockayne, D.M., Balliol.

Dr. H. Eltringham, M.A., D.Sc., New Coll. : Female *Asilus crabroniformis* : Margate (1923).

1922. A. H. Hamm : Female parent *Cephalonomia* sp. ? *formiciformis* (Hymenoptera Aculeata : Fossores); captured Aug. 1918, at Oxford, carrying prey with four of its offspring feeding on it: also imagines of latter with cocoons (1922, xxvi); *Gonepteryx rhamni*, Oxford (Oct. 14, 1922), the wings apparently eaten from the edge by a caterpillar (viii).

1922. W. J. Lucas, B.A. : Wasp with the fly which it had seized and the spider which it took in preference : Esher Common : 1922 (1922, ci).

THE HOPE LIBRARY.

A large number of valuable publications, many in exchange for the volumes of Hope Reports, have been received in the course of the year. The cataloguing and incorporation of additions to this important departmental library cannot be undertaken until it is possible to appoint a librarian.

E. B. POULTON.

Report of the Hope Professor of Zoology, 1924.

Exceptional circumstances have prevented the usual detailed account of the growth of the Hope Department in 1924. The most important event was the provision of additional space for the collections by the construction of a ferro-concrete floor in the northern section of the Old Radcliffe Library. This work, delayed by the building strike, is now complete save for the heating apparatus which it is hoped will soon be added, thus rendering this fine room available and relieving the congestion in other parts of the Department and in the corridors.

The Collection of Pierinac.

Dr. Dixey has named and incorporated a large number of accessions and has spent much time in studying the Pierines in the Bourke Collection. He hopes to publish an account of these in the near future.

The Collection of Orthoptera.

Dr. R. Hanitsch has continued his work upon the Orthoptera, especially the Blattidae, and has added many specimens from the duplicates of collections sent to him for determination.

The British Collections.

Mr. F. C. Woodforde has continued to give most valuable help to the collection of Macro-Lepidoptera, completing in October the census of British moths. The total number of labelled specimens in the twenty-three cabinets he found to be 35,725. The eight examples of the extinct *Hcodes dispar* (The "Large Copper Butterfly") bequeathed by the late H. Rowland-Brown, M.A., University, have been removed from his collection and, with the approval of Miss Rowland-Brown, placed with the other specimens of this species.

Mr. H. St. J. K. Donisthorpe has given further kind assistance to the collection of Coleoptera, the number of British species presented by him amounting to about 2,040 out of 3,500 known to exist.

Visits of Naturalists.

The Department has been visited by the following naturalists who have contributed specimens to the collections or in other ways helped in the work. Rev. G. Dexter Allen, from Singapore; H. E. Andrewes; Miss Balfour; Prof. W. Bateson, F.R.S.; Vernon G. Bell, Assist. Conservator of Forests, Malaya; Mrs. M. D. Brindley; Prof. J. Stanley Gardiner, F.R.S.; Major Philip P. Graves; A. F. Griffith; R. H. Harris, Tsetse-fly Investigation, Zululand; F. Morton Jones, Delaware, U.S.A.; W. J. Kaye; H. C. Robinson, Director of the F. M. S. Museums, Kuala Lumpur; Miss Rowland-Brown; Champion B. Russell; Miss A. Sverdrup, the John Innes Horticultural Institution; W. H. T. Tams.

The meeting of the Entomological Club took place on July 12-14, when the Department was visited by the following naturalists: R. Adkin; G. C. Champion, F.Z.S., A.L.S.; J. E. Collin; H. Donisthorpe, F.Z.S.; H. Willoughby Ellis, F.Z.S.; E. E. Green, F.Z.S.; W. A. Lamborn; Dr. G. A. K. Marshall, D.Sc., C.M.G., F.R.S.; Dr. S. A. Neave, D.Sc.; Capt. N. D. Riley; Dr. Hugh Scott, Sc.D.; H. J. Turner; Maj. C. A. Wiggins, C.M.G.

Fund for the Study of Social and Organic Evolution.

A grant has been authorized in aid of the publication by the Clarendon Press of Miss Dorothy Garrod's thesis on "The Upper Palaeolithic Age in Britain". Also a grant towards a fund to enable Mr. E. B. Ford, B.A., Wadham, to continue his researches in the Hope Department, and a grant to defray the expenses of Miss A. Sverdrup, during her visit to Oxford in order to study the Mendelian relationship between the female forms of the families of *Papilio dardanus*.

Hope Reports.

Volume XIII, bound towards the end of 1923, and the appendix to Vol. X, bound in 1924, have been distributed to the libraries and museums which receive this series. It is hoped that Vol. XIV will be bound and issued in the near future.

Published work in 1924.

References such as "xxxii" indicate the page of the "Proceedings of the Entomological Society of London" for 1924; such as "152" the page of the "Transactions" of the same Society for 1924. The "Entomologist's Monthly Magazine" is indicated by "E.M.M.". The papers concerned with the Ethiopian Region are placed together, leaving those concerned with other Regions and general subjects in a single group.

Ethiopian Region.

G. T. Bethune-Baker, F.L.S., F.Z.S.: "Descriptions of new African Rhopalocera" (Ann. Mag. Nat. Hist., July, 1924, p. 130).

Dr. H. Eltringham, M.A., D.Sc., New College: "Dr. V. G. L. van Someren's observations on the Early Stages of *Mimacraea marshalli dohertyi* Roth.", with pl. xii (152).

Walter Feather, F.E.S.: "Further notes on the nocturnal flight of the Ethiopian Hesperid *Ploetzia cerymica* Hew." (xxxii).

R. H. Harris: "Experiments proving that dummy animals are attractive to tsetse flies: a possible interpretation of results", with comments by the Professor and C. B. Williams, M.A., F.E.S. (lii); further communication, with a note by Dr. G. D. H. Carpenter (ciii); "The larva of the Coccinellid beetle *Ortalia pallens* Muls. devouring ants", with a note by Dr. Carpenter (cix).

A. W. J. Pomeroy, F.E.S.: "Observations on some of the insects, &c., on ant-trees; and on Lycaenid life-histories, at Ibadan, S. Nigeria", with comments by the Professor (lxxiii).

The Professor: "The larvae of Asilid flies of the genus *Hyperechia* (Laphriinae) preying upon the larvae of *Xylocopid* bees" (xxi) also (121); "A new race of *Amauris lobengula* E.M.Sh., from S.E. of Lake Rudolf, flying with a corresponding female form of *Papilio dardanus* Brown" (xxv); "The hind-wing patch of *Amauris albimaculata* probably darkened in mimicry of *A. ansorgei* E.M.Sh." (xxix); "*Danaida chrysippus* L., and *D. dorippus* Klug, proved by breeding to be two forms of the same species" (cxix); "The likeness to the

male *Acraea althoffi althoffi* Dew. closer in the female than the male of the Uganda f. *mimetica dolabella* Hall of *Pseudacraea dolomena albostrata* Lathy, &c." (cxl); "*Papilio dardanus*. The most interesting butterfly in the world", with pls. I-III (Journ. E. Afr. and Uganda Nat. Hist. Soc., Nov., 1924, p. 4).

The Rev. Canon K. St. Aubyn Rogers, M.A., Wadham: "Migration of the Pierine butterfly *Belenois mesentina* Cram., across the wind at Nairobi, towards the end of the dry season" (xxxi).

Dr. V. G. L. van Someren, C.M.Z.S., F.L.S.: "An invasion of 'Siafu' or Driver-Ants at Nairobi" (ix); "The African Nymphaline butterfly *Antanartia hippomene* Hübn. with a dimorphic larva, one form of which mimics the orange-and-black-banded larva of a Hyspid moth" (xi); "A series of twenty-three *Precis sesamus* Trim., showing transition from dry to wet forms, taken in half an hour at Nairobi, Kenya Colony" (xviii); "A flower-haunting Thomisid spider with its Muscid prey from Nairobi" (xxxix); "Notes on the life-history and insect food-preferences of a lichen-like Ascalaphid larva at Nairobi", with comments by the Professor (lix).

Other Zoological Regions, &c.

Dr. G. D. H. Carpenter, D.M., M.B.E.: "The wren in winter eating a large Staphylinid beetle, probably *Ocypus olens* L." (xxxvii).

W. E. China, M.A.: "On the luminosity of *Laternaria phosphorea* L." (xlix).

Dr. F. A. Dixey, D.M., F.R.S., Wadham: "Specific identity of *Catopsilia crocale* Cram. and *C. pomona* Fabr." (xxiii); "Pupation of *Catopsilia crocale* Cram." (lxxxiv).

Dr. H. Eltringham, D.Sc., New College: "On the abdominal Brushes in certain Noctuid Moths"; "On a new Organ in certain Lepidoptera"; "On the source of the Sphragidial Fluid in *Parnassius apollo* (Lepidoptera)". These three papers read December 3, 1924 (cxlix), will appear in the Transactions for 1925.

E. B. Ford, B.A., F.E.S., Wadham: "Two European butterflies that mimic the genus *Limnitis*" (cxlvii).

E. E. Green, F.Z.S., F.E.S.: "The remarkable cocoon of

the Noctuid moth *Labanda fasciata* Walk. (Sarrothripinae) from Ceylon", with text-fig. (xx).

A. H. Hamm, F.E.S.: "*Ptinus sexpunctatus* Panz. bred from the cells of the bee *Osmia rufa* L., in Oxford" (E.M.M., 1924, p. 29).

R. Kelly and Dr. R. C. L. Perkins, D.Sc., F.R.S., Jesus College: "An Australian bee, *Halictus* sp., ?*floralis* Smith, devouring Thrips" (xxxvii).

S. Maulik, F.E.S.: "The close resemblance between two Hispid beetles taken on the same grass at Kumaon, U.P., India" (xxxiii).

J. G. Myers, F.E.S.: "A dull black Tenebrionid beetle rejected by the insectivorous lizard *Sphenodon*" (xc).

Col. A. Newnham and the Professor: "The detailed resemblance of an Indian Lepidopterous larva to the excrement of a bird. A similar result obtained in an entirely different way by a Malayan spider" (xc); see also (cxlv).

The Professor: "The Longicorn beetle, *Chlorophorus* (*Clytanthus*) *annularis* F., breeding in the wall of a bamboo waterpot" (viii); "*Libythea laius* Trim., congregating, perhaps before or during migration" (ix); "Fijian butterflies: a corrected locality, &c." (xxxv); "The terrifying appearance of *Laternaria* (*Fulgoridae*) founded on the most prominent features of the alligator", with pl. A (xliii); "Dr. J. Bequaert's memoir on the predaceous enemies of ants" (lxviii); "John H. Gerould's researches on the inheritance of white wing colour in yellow Pierine butterflies: his criticism of mimicry" (lxxi); "An Entomological contribution to the understanding of Minoan symbolism" (lxxix); "Some Transformations of the pale yellow strongly fluorescent pigment of *Papilio*s, &c." (xcix); "The effect of prolonged exposure to light upon the pigments of *Lepidoptera*, &c." (cxiv); "A group of beetles collected on the shrub *Angophora cardifolia* Cav., near Sydney, by T. G. Sloane; with the flower-bearing branches preserved by H. J. Carter" (cxxxvii); "Modes of Protection in the Pupal Stage of Butterflies and Moths" (Trans. S.E. Union Sci. Societies, 1924, p. 72); "The Relation between Pure and Applied Biology" (Ann. of Applied Biol., xi, Oct., 1924, p. 271).

Dr. C. H. T. Townsend: "H. W. Bates' Egg after seventy years" (xli).

Dr. P. Vignon, of the Paris Museum of Natural History: "The determination of the leaf-like Tettigoniids collected by C. H. Lankester in Costa Rica", with comments by the Professor (lxv).

Dr. C. L. Withycombe, Ph.D., M.Sc.: "A Trinidad moth resembling the base of a leaf" (cxiii).

ADDITIONS TO THE COLLECTIONS.

The interesting collection of insects from the Falkland Islands presented in 1922 by Mr. and Mrs. Rupert Vallentin has now been named, arranged, and every specimen supplied with a printed label. It forms an interesting addition to the faunistic collections which are becoming a special feature of the Department.

Mention must also be made of the Spitzbergen collection of insects made in 1924 by Mr. C. S. Elton, B.A., New College, and his colleagues, which has been mounted and labelled for examination by experts in the various groups.

The families of *Papilio dardanus* bred from known female parents at Nairobi by Dr. V. G. L. van Someren form one of the most interesting features of the Department. In addition to the twelve families acknowledged in last year's report, over fifty were received safely in 1924. The setting and labelling of these was completed in time for Miss A. Sverdrup's visit.

Valuable accessions from the following donors were received in 1924 or incorporated from the material presented in earlier years. Some account of the gifts will be given in a future report.

The British Museum; Dr. Malcolm Burr, D.Sc., New College; Dr. G. D. H. Carpenter, D.M., M.B.E.; Dr. E. A. Cockayne, D.M., Balliol; David Cole; W. Feather, F.E.S.; Mrs. D. R. Fyson; Sir Kenneth Goadby; A. H. Harrison; J. J. Joicey, F.L.S., F.Z.S.; Dr. R. E. Kunze; W. A. Lamborn, F.E.S.; C. H. Lankester, F.E.S.; H. Mace, F.E.S.; Dr. S. A. Neave, M.A., D.Sc., Magdalen; Prof. R. Newstead, F.R.S.; The Pitt-

Rivers Museum ; Dr. A. Eland Shaw, F.E.S. ; Dr. V. G. L. van Someren, C.M.Z.S., F.L.S. ; C. F. M. Swynnerton, Game Warden, Tang. Terr. ; H. J. Turner, F.E.S. ; Commander J. J. Walker, Hon. M.A., F.E.S ; Major C. A. Wiggins, C.M.G. ; Dr. C. L. Withycombe, Ph.D., M.Sc.

Many Lepidoptera specially wanted by the Department have been purchased from G. F. Leigh, of Durban.

Additions to the British Collections, especially the Lepidoptera.

The specimens kindly presented by the following donors will be acknowledged in a future report :—

B. W. Adkin, H. W. Andrews, Rev. C. Ash, Miss Balfour, J. Collins, B. H. Crabtree, Col. C. Donovan, A. F. Griffith, C. L. Hall, A. H. Hamm, W. J. Lucas, Rev. F. D. Morice, M.A., F.Z.S., Queen's ; L. W. Newman, A. Robinson, Mrs. Rowley, R. South, G. Tickner, H. Trim, Commander J. J. Walker.

Certain Lepidoptera, specially wanted by the collection, were purchased from L. W. Newman, and many were selected by Mr. Woodforde from the specimens left in cabinets bought for the Department at Stevens's Auction-rooms.

THE HOPE LIBRARY.

Chief among the many valuable additions to the library are Professor Westwood's private copies of his "Arcana Entomologica" (vol. i, 1841-43 ; vol. ii, 1843-45), and his "Introduction to the Modern Classification of Insects" (vol. i, 1839 ; vol. ii, 1840), presented by his nieces. These volumes, which contain abundant notes in the author's handwriting, are of the deepest interest and importance. Many packets containing Professor Westwood's manuscript notes and sketches, of which the late Dr. Hatchett Jackson had been unable to complete the study, were, with the approval of Miss Jackson and Miss Swann, transferred to the library of the Hope Department. Many valuable works from Dr. Jackson's library were also kindly presented by Miss Jackson.

Another interesting accession is a series of beautiful coloured drawings of insects and other animals painted in 1835-37 by Miss Anna Carr, presented by her nephew Major Norris.

E. B. POULTON.

Report of the Hope Professor of Zoology, 1925.

The arrangement of a part of the Hope Collections in the new room constructed over the north end of the Old Radcliffe Library could not be carried out in 1925, because of the delay in completing the heating system. The work is now in hand and it is expected that it, as well as all the consequential rearrangements, will be quite finished before the meeting of the British Association in August.

The Collection of Pierinac.

Dr. Dixey has now completed the study and determination of the Pierinae from many parts of the world in the Bourke Collection bequeathed to the University in 1923. He has also determined the Pierines in several smaller collections from various localities, and has written the papers referred to in the list of publications.

The Collection of Orthoptera.

Dr. R. Hanitsch has continued his work upon the Blattidae and other Orthoptera. In addition to the published papers included in the list, he has completed a memoir on the Blattidae of S. Annam, collected by Mr. C. Boden Kloss, now Director of the Raffles Mus., Singapore, and Dr. Malcolm Smith, in large part at high elevations (5,500–7,500 ft.), and therefore rich in new species. One Blattid of a new genus and species was also found at the same elevation (6,500 ft.) on Mt. Murud, Sarawak. Dr. Hanitsch has also begun the study of nearly 1,000 Blattidae collected in the Mentawi Is., W. Sumatra, by Mr. Kloss and Dr. H. H. Karny of the Buitenzorg Museum, Java, and, with the kind help of Mr. B. Uvarov of the Brit. Mus., has named Orthoptera for the Luxembourg (G. D.) Mus. All this work has greatly enriched the University Collection by the addition of duplicates.

The British Collections.

Mr. F. C. Woodforde has continued to give his kind assistance in the arrangement of the Lepidoptera. With the increasing interest in the study of insects, the British Collections have become of special importance, and much time and attention have been devoted to them by the Staff. Among the numerous accessions incorporated during the year, special mention must be made of the extremely interesting collection of Fossorial wasps and their insect prey, presented by Mr. A. H. Hamm. Further details concerning this valuable gift will appear in future reports, for Mr. O. W. Richards, B.A., Brasenose, is collaborating with Mr. Hamm in preparing a record of the careful observations embodied in the collection.

Visits of Naturalists.

The Department has been visited by the following naturalists who have contributed specimens to the collections or in other ways helped in the work. Miss Balfour; E. D. Bostock; G. H. Bullock, M.A., New College; G. C. Champion, F.Z.S., A.L.S.; Col. Donovan; A. F. Griffith; C. F. Johnson; W. J. Lucas, B.A.; A. J. Nicholson, Sydney Univ.; Dr. R. C. L.

Perkins, D.Sc., Jesus Coll., F.R.S.; W. Walmesley White; Maj. C. A. Wiggins, C.M.G.; C. B. Williams, M.A., Cairo.

Among other naturalists who have visited the Hope Department in order to inspect various parts of the Collection were: Señor C. Bolivar Pieltain, of Madrid—the Orthoptera; Mr. G. M. Henry, of the Colombo Museum, and Prof. Paul S. Welch, Ann Arbor Univ.—the bionomic series; Prof. E. Study, of Bonn—mimicry in Lepidoptera. The late Prof. Bateson renewed an old interest when he examined some of the most striking examples of eye-spots on the wings of butterflies, and looked forward to future visits when he could again study the subject in detail.

The quinquennial meeting of the Imperial Entomological Congress was held in London during the summer, and June 13 was fixed for the visit to Oxford. The following delegates were present: Maj. E. E. Austen, D.S.O., Brit. Mus.; C. P. Lounsbury, S. Africa; J. G. Myers, Bussey Inst., Boston, U.S.A.; A. W. J. Pomeroy, Nigeria; D. W. Scotland, Sierra Leone; C. F. M. Swynnerton, Game Warden, Tang. Terr.; F. W. Urich, C.M.Z.S., Trinidad. The party was accompanied by the Director, Dr. G. A. K. Marshall, and the Assist. Director, Dr. S. A. Neave, of the Imperial Bureau of Entomology.

The meeting of the Entomological Club took place on July 4-6, when the Department was visited by the following naturalists: R. Adkin; J. E. Collin; H. Donisthorpe, F.Z.S.; H. Willoughby Ellis, F.Z.S.; W. J. Kaye; Dr. G. A. K. Marshall, D.Sc., C.M.G., F.R.S.; W. H. T. Tams; H. J. Turner; Maj. C. A. Wiggins, C.M.G.

Fund for the Study of Social and Organic Evolution.

The Rev. F. C. R. Jourdain's memoir on "Parasitism in the Cuckoo", towards which a grant had been made, appeared in 1925 (P. Z. S., p. 639). This important paper, together with that of Mr. E. C. Stuart Baker (P. Z. S., 1923, p. 277), gave a comprehensive survey of this most interesting subject, incorporating many new facts and illuminating hypotheses, thus enabling the naturalist for the first time to grasp the

bearings of this aspect of organic evolution, and to study its relation to other aspects.

Grants were made to Mr. G. H. E. Hopkins at Apia, W. Samoa, to defray the expense of collecting material in the Samoan and Tongan groups. The problems of evolution are reduced to their simplest terms in the oceanic islands of the Pacific, and it is hoped by these grants to advance a hopeful study already aided by previous grants.

The grant to Mr. E. B. Ford, B.A., Wadham, has been continued, and a grant authorized towards the lectures on the structure of living cells delivered by Professor R. Chambers of Cornell University, U.S.A., in the Department of Zoology and Comparative Anatomy.

Hope Reports.

The unbound material accumulated is so great that probably two volumes will be required.

Published work in 1925.

References such as (xxxii) indicate the page of the "Proceedings of the Entomological Society of London" for 1925; such as (152) the page of the "Transactions" of the same Society for 1925. The "Entomologist's Monthly Magazine", 1925, vol. lxi, is indicated by (E.M.M.), the "Entomologist", 1925, vol. lviii, by (Ent.). The papers concerned with the Ethiopian Region are placed together, leaving those concerned with other Regions and general subjects in a single group.

Ethiopian Region.

Dr. G. D. H. Carpenter, D.M., M.B.E.: "Pseudacraca eurytus and its models in E. Uganda" (xiii); "Various observations on insects in Uganda" (liii); "Insects, &c., from Nkosi, the southernmost of the Sese Islands, N.W. Victoria Nyanza" (lxxiii).

F. D. Golding, F.E.S.: "Ant-like beetles taken with their model in S. Nigeria" (iii).

Capt. A. L. Kent-Lemon, F.E.S.: "Planemoides ♀ f. of Pap. dardanus and its model from Mongalla Prov., Sudan" (xiv).

G. F. Leigh and the Professor: "The larval habits of *Anaphe panda*, the 'Processional moth': Natal" (xxxii).

The Professor: "Some chief E. African Asilid mimics with their *Xylocopid* models" (xiii, pls. B, C); "New races of *Papilios* from S.W. Abyssinia and Somaliland" (xlii, pl. D).

Capt. N. D. Riley: "A Revision of the continental African species of the genus *Artitropa*" (281, pl. xxxv).

Dr. V. G. L. van Someren, C.M.Z.S., F.L.S.: "Butterflies and a moth captured by flycatchers for their young: insects from crop of Marabout Stork: Nairobi district" (xxxiv); "Cassidid beetle pest of a timber tree in Kenya Col." (lxiii).

Dr. van Someren and the Professor: "Forms of *Papilio dardanus* and their models from Marsabit, S.E. of L. Rudolph" (viii); "Mimetic association between *Reduviid* bugs and *Carabid* beetles in Kenya Col. and Uganda" (ix, pl. A).

Capt. A. R. Stoneham, K.A.R., F.E.S.: "Wasps of same species with transparent and dark wings from same nest: N. Uganda" (xxxii).

Mrs. E. M. Waterfield: "Life-history of *Calopieris eulimine*: Pt. Sûdân" (xxvi, xxxii).

Other Zoological Regions, &c.

Dr. E. A. Cockayne, M.A., D.M., F.R.C.P., Balliol: "Teratological Specimens in the Hope Department" (395, pls. xliii—xlv).

C. L. Collenette, F.E.S.: "The present status of *Danaida plexippus* in the Pacific Islands" (E. M. M., 198).

Dr. F. A. Dixey, D.M., F.R.S., Wadham: "Scents in Canadian butterflies" (xxv); "Development of scent-scales in *Ganoris rapac* ('Small Garden White')" (lix).

Dr. H. Eltringham, M.A., D.Sc., New College: "On the Abdominal Brushes in certain male Noctuid Moths" (1, pl. i); "On a new Organ in certain Lepidoptera" (7, pl. ii); "On the Source of the Sphragidial Fluid in *Parnassius apollo*" (11, pl. iii); "On the Abdominal Glands in *Heliconius*" (269, pl. xxxiii); "On the Structure of the Ocelli in *Plusia gamma*" (277, pl. xxxiv).

C. S. Elton, B.A., New College : "The Dispersal of Insects to Spitsbergen" (289).

A. H. Hamm, A.L.S., F.E.S. : "Abnormally late emergence of *P. atalanta* at Oxford in 1924" (xv).

Dr. R. Hanitsch, Ph.D. : "Blattidae collected by Prof. Gregory's expedition to Yunnan" (Jour. and Proc. As. Soc. Bengal, xx, 1924, No. 6, p. 337 : issued Nov., 1925) ; "On a collection of Blattidae from N. Sarawak" (Sarawak Mus. Journ., iii, p. 75, 18 text-figs. : Dec., 1925).

A. C. Hardy, M.A., New College : "A Noctuid moth from the summit of Mt. Hekla, Iceland" (xxxvii).

Dr. K. Kunhi Kannan, Ph.D. : "Confirmation in S. India of Dr. V. G. L. van Someren's observations on *Hyperechia* and *Xylocopa* at Nairobi" (xii).

C. H. Lankester, F.E.S. : "Interesting Tettigoniidae from Costa Rica" (lviii).

W. J. Lucas, B.A., F.E.S. : "British Orthoptera in the Dale Collection. II. Grasshoppers" (E.M.M., 246).

Prof. R. Newstead, F.R.S. : "Large moth accepted by young of 'Parrot-billed Blackbird' : Jamaica" (xxxvi).

The Professor : "Butterfly and Chrysalis as a Symbol in Ancient Religious Beliefs" (iii) ; "Euploeas of Fiji : a correction" (xvii) ; "Note on larva of *Amphidasys betularia*" (lxv) ; "A Swiss butterfly bearing the evidence of attack by a broad-billed bird" (lxx) ; Appendix (580, pl. lx), "Terrifying and Warning Attitudes in Caterpillars", to Maud D. Haviland's (Mrs. H. H. Brindley's) paper : "Defensive Colour and Pattern in four Caterpillars from British Guiana" (575, pl. lix ; also p. lxxiii).

W. G. Sheldon, F.Z.S. : "Notes on the series of *Peronea cristana* in the Dale Collection, and on the Type-specimen of *ab. gumpinana* included therein" (Ent., 2).

H. W. Simmonds, F.E.S. : "*Troides brookiana albescens* near Kuala Lumpur, F.M.S." (lxiv).

Commander J. J. Walker, Hon. M.A., F.L.S. : "A female larva of *Drilus flavescens* in the last feeding stage, found in a house near Winchester" (lxiv) ; "Longevity in a Buprestid beetle" (E.M.M., 183) ; "Weevils bred from seed-heads of *Plantago lanceolata*" (E.M.M., 257).

E. G. R. Waters, M.A., Exeter: "Influence of certain leaf-mining larvae in preserving tissue of autumnal leaves so that it remains green and is free from attack by other larvae" (lxvi); "Tincina in the Oxford District" (E.M.M., 188).

C. Willemse, of Eysgelshoven, Holland: "Contribution à la Faune des Orthoptères des Nouvelles-Hébrides". Avec une introduction de J. R. Baker, B.A., New College (513, pl. li, 5 text-figs.).

Dr. C. L. Withycombe, Ph.D., M.Sc.: "A Trinidad butterfly, *Prepona antimache*, with symmetrical injuries to F. wings" (xxxvii); (with the Professor): "Scents emitted by the butterfly *Heliconius erato hydarus*: Trinidad" (xxxvii).

F. C. Woodforde, B.A., Exeter: "Notes on the British Macro-Lepidoptera in the Hope Department" (Ent., 177).

ADDITIONS TO THE COLLECTIONS.

The following donations have been incorporated in 1925, but many of them were received in earlier years.

Many accessions include the material recorded in the publications of the Entomological Society of London, referred to briefly as "Proc." and "Trans.", with the addition of the year and page. The elevation at which a capture has been made is given by a number, e.g. "6,500", feet being understood.

Ethiopian Region.

Rev. G. T. Basden: 30 Lepidoptera, Onitsha distr., R. Niger.

G. T. Bethune-Baker, F.L.S.: 2 Lycenidae, Ndarugu, Tang. Terr.

British Museum (Nat. Hist.): The butterfly *Euxanthe trajanus*, with distinct beak-mark, Entebbe, Uganda. Coll. by Dr. Neave, xi, 1911. In exchange. Proc. 1924, cxi.

Dr. G. D. H. Carpenter, D.M., M.B.E.: the following butterflies: 28 *Charaxes*, Damba I. and Bugalla I., NW. Victoria Nyanza; 23 *Hypolimnas*, Kakindu, 30 m. W. of Victoria Nyanza, Tang. Terr.; 12 specimens (with 2 other insects), Busabi, E. Uganda, including material of Proc. 1925, xiii; 5 pairs of Pierinae *in coith*, Isipingo, Natal, 1918, additional to evidence in Proc. 1918, cl.

Dr. Carpenter and Maj. C. A. Wiggins, C.M.G. : 30 butterflies of genus *Hypolimnas* and 1 *Apaturopsis cleochares*, Semliki Vall., W. Uganda, abt. 3,000, vii, viii, 1921. Proc. 1923, lxii.

David Cole : 9 Lepidoptera, including 1 *Pap. nobilis* : Gilgil, Rift Vall., Kenya Col., 1923-4.

W. Feather, F.E.S. : 67 Lepidoptera from E. Kenya Col. and E. Tang. Terr., including 9 *Acraca equatorialis anaemia*, Moa, T.T., and a series of ♂ *Pap. dardanus tibullus*, Kibwezi, to compare with specimen of Proc. 1922, lxxv.

F. D. Golding, F.E.S. : two species of ant-like Anthicid beetles taken with their models on the same plant : Ibadan, S. Nigeria, iv, 1924. Proc. 1925, iii.

A. H. Harrison : 29 butterflies, Nyangori, NE. Victoria Nyanza, about 1902. Including series of *viola*-like ♀ of *Charaxes ethocles*.

Arnold Hodson : the following specimens have been incorporated out of the splendid Abyssinian collection made and presented by Mr. Hodson : *Papilio rex abyssinicus* (Type), *P. dardanus hodsoni* (Type and 5 Paratypes), *P. cynorta arnoldi* (Type and 4 Paratypes), *P. ccherioides oscar* ♂ ♀, and the Danaïne models of female *arnoldi* and *oscarus*, viz. 2 *Amauris niavius aethiops*, and 2 *A. ccheria steckeri* respectively. Proc. 1925, xlii-lit.

J. J. Joicey, F.L.S. : ♂ ♀ *Pseudacraca dolomena pharsa*, Lindi and Tanga, E. Africa ; 2 *Hypolimnas mechori*, Cameroons : the latter in exchange.

W. A. Lamborn : the following specimens have been incorporated from the very fine collection made by the donor in 1910-12, in the Oni distr., 70 m. E. of Lagos : a long series of *Hypolimnas* (71 catalogued) including 3 of the very rare *H. chapmani* ; a set of Danaïne models and the forms of *H. dubia* mimicking them ; a pair of *Planema e. epaca* (♀ the model of *P. c. cynorta*) ; 41 *Charaxes* and allied genera. Many bred specimens are included. Of great interest is a pupa within which can be seen *Danaïda chrysippus* of the typical form. This being bred from the egg laid by a female of the form *dorippus* (capt. iv. 1924, at Fort Johnston, Nyasa-

land), provided the first decisive evidence that the two forms belong to the same species. Proc. 1924, cxix, where it is shown that Dr. V. G. L. van Someren obtained the same evidence on a larger scale at Nairobi, a few months later.

A. Loveridge, F.E.S.: 11 Xylocopid bees, E. Africa; elytra of a Meloid beetle eaten by a Gecko, and of another Meloid observed ovipositing, Kilosa, Tang. Terr. Proc. 1921, xc.

Nat. Hist. Museum, Luxembourg (G. D.): 69 butterflies, nearly all from Kondué, Kasai, Belgian Congo, including 2 *H. mechowii*, much wanted.

H. Mace, F.E.S.: 14 Pierine butterflies, Khartoum, viii, 1922. Trans. 1922, 240; Proc. 1923, xlv.

Dr. S. A. Neave, Magdalen: 14 Asilid flies, *Hyperochia*, and their Xylocopid bee models, Mt. Mlanje, Nyasaland, 1913, Proc. 1925, xiii. pl. C; a fine series of *Pseudacraea dolomina albostrata* and its form *dolabella*, Uganda, 1911-12, part of series referred to in Proc. 1924, cxl.

Pitt-Rivers Dept.: 6 Coleoptera, Sudan, 1923.

Dr. V. G. L. van Someren, M.B.O.U., F.L.S.: the following interesting Nymphaline butterflies, much needed by the Dept., captured, unless otherwise stated, in the Jinja district of Uganda: 3 *Charaxes zelica*; 3 *C. porthos*; 6 *C. bipunctatus*; *C. fulvescens monitor* with its mimic the ♀ *Palla ussheri interposita*; 3 *C. etheocles* new ♀ f.; 2 *Cymothoe herminia*; 6 *Neptis poultoni*; 10 Dry, 10 Wet Season forms, *Precis sesamus*, taken in half an hour under a house, Nairobi, 24. ix. 1923, towards the end of the Dry Season (Proc. 1924, xviii); *Pseudacraea lucretia* new ♀ f., Nairobi, 1. ii. 1925, with 9 ♀ ♀ of same form and 5 ♂ 2 ♀ of ordinary form reared from its eggs. Other butterflies include: 2 *Acraea humilis*; 9 Lycaenidae (one with beak-marks); 4 *Papilio rex mimeticus*; 2 *P. d. dardanus* ♀ f. *planemoides*; 2 Hesperidae probably mimetically associated. Also (from Nairobi distr.), of great bionomic interest: fragments of the Lepidoptera captured and given to young by Flycatchers, and insects from the crop of a Marabout Stork, as described in Proc. 1925, xxxiv-xxxvi; a beetle injurious to a timber-tree and Hemipterous enemies of the pest, Nairobi, Proc. 1925, lxiii; also, from Nairobi and

the Jinja district, an interesting series of parasitic Hymenoptera bred from Lepidopterous larvae. From an interesting and little-known locality, Marsabit, SE. of Lake Rudolph, vii. 1923: 15 butterflies, including Danaine models and *Pap. dardanus* ♀ fs. mimics, including types of the new race *Amauris lobengula septentrionis* and its mimic the new ♀ f. *ochracea*.

Dr. V. G. L. van Someren and Dr. Robert van Someren: 3 ♀ fs. of *Charaxes etheocles*, Jinja district, 1923-4, with the families reared from their eggs, proving conclusively that the widely different forms *cedreatis*, *carpenteri*, and a new f. to be described as *vansomereni*, are all females of the ♂ f. known as *picta*. These families were shown at the Third Internat. Entom. Congress at Zurich, in July 1925, and a full account of them will appear with a coloured plate in the Proceedings.

C. F. M. Swynnerton: 3 forms of *Charaxes ethalion*, of which 2 are recorded in Proc. 1918, lxxix. These breeding experiments at Chirinda, SE. Rhodesia, proved that the ♀ fs. *ethalion* and *swynnertoni* are one species. Also from Chirinda, Nymphaline butterflies, including 23 *Charaxes*, 9 *Hypolimnas*, and 1 rare ♀ *Apaturopsis cleochares*.

Commander J. J. Walker, Hon. M.A.: 8 butterflies, S. Thomé I., W. Africa, about 1883. The locality renders the specimens of great interest.

Mrs. E. M. Waterfield: Egg and pupa-case of *Calopieris eulimine*, Pt. Sudan, Proc. 1925, xxxii.

Maj. C. A. Wiggins, C.M.G.: 51 butterflies from localities in Toro, W. Uganda, 1910-11, including an interesting series of 3 species of *Amauris* (Danainae) with similar patterns and a Nymphaline mimic, the whole convergent group of 6 specimens taken about 1 Sept. 1911 at the N. of L. George, Toro; *Planema epaea paragea* and its mimic *Pap. c. cynorta*, ♀, taken on same day, 1. vi. 1912, 38 *Charaxes* and allies, including 2 ♀ *Ch. anticlea adusta* and 4 *Charaxes* with evidence of attack, nr. Entebbe, Uganda.

Oriental Region.

H. G. Champion, M.A., New College: The following five accessions from the United Provinces, N. India: S. Kumaon—

99 moths, Nainital, 6,500, 1923-4; 9 moths, Haldwani Forest Div., 1,000, 1924; Central Kumaon—14 Lepidoptera: various localities, 4,800-8,500, 1920, 1924; N. Kumaon—112 Lepidoptera, including 3 injured probably by enemies: various localities up to 16,000 at Shelshel, subdistr. M. Johar, vi-viii, 1924. From SW. Tibet—24 Lepidoptera: various localities, 16,000, vii, viii, 1924. These latter high elevations are transitional into the Palaearctic Region.

Dr. E. A. Cockayne, D.M., Balliol: 3 *Danaiida chrysippus bataviana*, Java, vi, 1910.

* Col. C. Donovan, late I.M.S.: 425 butterflies (including 181 Lycaenidae and 111 Hesperidae) and 5 beetles from various S. Indian localities.

Mrs. D. R. Fyson: A series of *Papilio polytes*: males and two mimetic forms of female taken with their models nr. Madras City, viii, 1915, on flowers of *Stachytarpheta indica*. Proc. 1915, xcii.

J. J. Joicey, F.L.S.: ♂ and ♀ of the diurnal Agaristid moth *Immetalia saturata longipalpis* mimicked respectively by the ♀ and ♂ of the Erycinid butterfly *Praetaxila poultoni*, Dutch New Guinea. A remarkable reversal of a well-known relationship in mimicry. Proc. 1921, xc; Bull. Hill Mus., i, No 2, p. 363.

O. C. Ollenbach, F.E.S.: 113 butterflies from the U. P., N. India: 73, Mussoorie, W. Himalayas, 5,500; 40, Dehra Dun, 2,200.

W. Ormiston, F.E.S.: 160 butterflies, Ceylon.

The late G. A. James Rothney, F.E.S.: 262 Lepidoptera, nearly all Darjiling distr.; 320, Barrackpore Park, Calcutta.

Neotropical Region.

Dr. Malcolm Burr, D.Sc., New College: 64 Orthoptera, part of a collection described by J. A. G. Rehn of Philadelphia. Tr. Am. Ent. Soc., xliii, 335. Collected by Dr. Burr chiefly in the Rio distr., Brazil.

J. J. Joicey, F.L.S.: 2 Ithomiine butterflies and their Heliconine mimics, Muzo, Colombia; the Nymphaline butterfly *Coenophlebia archidona*, R. Perené, Central Peru.

C. H. Lankester, F.E.S.: 6 striking examples of protective resemblance, a Geometrid moth and 5 Tettigoniidae (Locustidae) including 2 ♂, 1 ♀ of *Mimetica*; also a ♂ Deltoid moth with elaborate scent-organ on F. W., all Cartago, Costa Rica, 1924-5. Proc. 1923, lxxxiii; 1924, lxv; 1925, lviii; 1926, Mar. 17.

Newnham College, Cambridge: A valuable series of specimens selected from the Collection of Membracidae (Homoptera) made in British Guiana in 1922, and described by Maud D. Haviland (Mrs. H. H. Brindley) in N.Y. Zool. Soc.'s Zoologica, vol. vi, No. 3, p. 229.

Prof. R. Newstead, F.R.S.: An immense Noctuid moth *Otosema odora*, 6 in. wing expanse, offered to young by the "Savannah Blackbird" *Crotophaga ani*, Jamaica, i. 1909. Also a skin of the bird. Proc. 1925, xxxvi.

W. Schaus, F.Z.S., of the National Museum, Washington: The very valuable gift of 1,626 species (3,169 specimens) of Costa Rican Lepidoptera. All the species are determined by this distinguished authority on S. American Lepidoptera. It is hoped that the Department will be able to make some return to the American National Museum for this splendid accession received from one of the staff.

H. J. Turner, F.E.S.: ♂ and ♀ *in coitū* of the Pierine butterflies, *Colias vautieri*, Chile, and *Xanthidia nicippe*, N. Carolina.

Dr. C. L. Withycombe, Ph.D., M.Sc.: 2 leaf-like Pyralid moths, *Acrodegmia pselaphialis*, Trinidad, v. 1924, Proc. 1924, cxiii; a Nymphaline butterfly *Prepona antimache* with symmetrical injuries to wings, Trinidad. Proc. 1925, xxxvii. *Palearctic Region (excluding Britain).*

A. E. Burras, F.E.S.: 99 butterflies, Larche, Basses-Alpes, vii, viii. 1924, including *Parnassius apollo* with dwarf R. H. Wing for teratological series; 158 Lepidoptera, Auzat, Ariège Dept., Pyrenees, 2,300-2,500, viii. 1925.

C. S. Elton, B.A., New College: An account of the deeply interesting collection of insects made in the three Oxford University Expeditions to Spitzbergen is deferred. An astonishing example of transport over a wide extent of sea is described in Mr. Elton's paper referred to in the list of publications.

Sir Kenneth Goadby: Saturniid moth, Riviera, 1923-4.

A. C. Hardy, M.A., Exeter College: The Noctuid moth *Episilia quadrangula* (Agrotinae), top of Mt. Hekla, Iceland, viii. 1924. Proc. 1925, xxxvii.

The late Prof. R. Meldola, Hon. D.Sc., F.R.S.: 35 Lepidoptera, various European localities, 1877, 1895, including *Ercbia* with distinct beak-mark. Proc. 1925, lxx.

Prof. R. Newstead, F.R.S.: 7 predaceous Hymenoptera Aculeata, 6 with Dipterous prey, 1 with Noctuid moth, France, 1915.

The Professor and Dr. E. P. Poulton, D.M., Balliol: Insects from Heligoland and the adjacent Düne, viii. 1901, including a long series of the Acridian (grasshopper) *Stauroderus bicolor*, red-brown, from Heligoland, pale sand colour from the Düne.

H. J. Turner, F.E.S.: Asilid fly and its butterfly (*Ercbia*) prey, Bérisal, Switzerland. Capt. by Col. N. Manders.

Brit. Mus.: 2 *Heodes phlaeas flava*, Gyangtse, Tibet, 13,000, vi. 1904. In exchange.

Purchased with a cabinet: 3 *H. p. phlaeas*, Corsica; 2 Pierinae, Nice.

Other Zoological Regions, &c.

Prof. T. D. A. Cockerell: 14 Lepidoptera, New Mexico, U.S.A., 1902; 9 Ithomiine butterflies, Jolima, nr. Chaparral, Colombia. Capt. by J. Terry Duce.

H. M. Hull: 27 Diptera, U.S.A. In exchange.

Dr. R. E. Kunzé: 2 Lepidoptera, U.S.A.

Lt. L. R. Mosse-Robinson, R.N.: The hawk moth *Chromis erotus* taken from the stomach of a fish in Suva Harbour, Fiji, 1914. Proc. 1916, viii.

Dr. Eland Shaw: 2 Agaristid moths, Fernshaw, Victoria, 1913.

H. J. Turner, F.E.S.: ♂ and ♀ of the Lycaenid butterfly *Eumaeus atala*, Florida. Capt. by G. B. Pearson.

Commander J. J. Walker, Hon. M.A., F.L.S.: 34 marine Hemiptera of genus *Halobates*, a most interesting series, from mid-Pacific, 1882; Marquesas Is., 1883; Nimrod Sound, China, 1892; New Hebrides, 1900; and Torres Is., 1900. E. M. M., vol. 29, pp. 227-9; vol. 38, pp. 196, 199, 203.

British Museum: 12 Coleoptera, either paratypes or specimens compared with the types of Rev. F. W. Hope; 15 Heteromorous beetles of species described by Hope in Gray's Zool. Miscell., 1831, pp. 31, 32; 8 Blattidae. All the above received in exchange.

Additions to the British Collections.

B. W. Adkin, F.E.S.: 122 Lepidoptera from interesting localities, e. g. Scillies, Orkneys, Shetlands, &c.

H. W. Andrews, F.E.S.: Pair of Asilid fly *Entolmus rufibarbis*, Farningham, Kent, viii. 1924.

Rev. C. Ash: 136 moths from Yorkshire localities, including examples of *Spilosoma lubricipeda*, var. *fasciata*, *Plusia iota* and *pulchrina*, *Abrostola urticae* and *triphasia*, *Xanthia aurago*, dark vars. *Boarmia repandata* and *rhomboidaria*.

Miss Balfour, F.E.S.: 107 moths from Whittingehame, E. Lothian, and adjacent localities.

K. G. Blair, B.Sc.: *Pyrameis atalanta* ("Red Admiral") with beak-mark on F. W., Norwich, ix. 1925.

J. Collins: 123 moths, a very interesting series from varied localities, and including 2 *Acronycta alni*; 2 *Dianthoecia albimacula*; 3 *D. capsophila*; 5 *D. conspersa*; 2 *Leucania favicolor*; 3 *Mamestra abjecta*; 3 *M. albicolon*; 2 *Polia xanthomista*; 6 *Hoplorina croceago*; 4 *Agrotis ashworthii*; 7 *Celaena haworthii*; 7 *Lithosea sericea* (Rixton Moss, nr. Warrington, vii. 1903). Also the Dipteron *Compsilura concinnata*, bred, Woking.

B. H. Crabtree, F.E.S.: 31 butterflies, including a fine series of early *L. adonis*, Folkestone, vi. 1923; 78 moths, including 2 *Cymatophora or*, Galway, vi. 1893; 2 *Hecatera chrysozona*, Colchester, 1896, Suffolk, 1898; 4 *Mamestra (Hadena) contigua*, Scottish localities; 5 dark vars. and 5 var. *lacticolor*, *Abraxas grossulariata*, Liverpool district and Scottish.

H. St. J. K. Donisthorpe, F.Z.S.: Examples of 32 species of British beetles, increasing the number presented by the donor to 2,040 out of the 3,500 on the British list.

Col. C. Donovan, late I.M.S.: 16 moths, Faringdon, Berks., including *Agrotis pyrophila (simulans)*; *Laphygma exigua*; and

vars. of *Noctua umbrosa*, *Agrotis exclamationis*, *Plusia gamma*, and *Melanippe fluctuata*; also *Callimorpha dominula* bred from the egg, Buckland Heath, Berks., vii, 1923.

The late Prof. W. M. Geldart: 30 moths have been labelled and added to the collection, in addition to the 1,850 incorporated in 1923.

A. F. Griffith: 90 moths, including 3 *Pachetra leucophaea*; 14 *Noctua festiva*, var. *thulei*, Shetlands; 6 *Plusia orichalceca*, Wicken and Chippenham Fens; 3 *Boarmia repandata*, W. Ross-sh.; 6 *Anticlea sinuata*, Cambr. distr.; and other valuable accessions.

C. L. Hall: 8 bred moths of genus *Tacniocampa*, Ludlow distr., ii, 1924.

A. H. Hamm, A.L.S.: 4 *Gastrophilus equi* ("Horse Botfly"), Newbury, viii, 1919, E.M.M., 1919, p. 229; 4 Lepidoptera with dwarfed wings on one side, Oxon. and Berks. localities. For Teratological series. The gift of his great collection of Fossorial Wasps and their prey is acknowledged on p. 10.

W. J. Lucas, B.A.: 3 ♂ 2 ♀ of the predaceous Dipteron *Empis tessellata*; 3 with Dipterous prey, New Forest, vi, 1924.

Rev. F. D. Morice, M.A., Queen's: 15 *Pteronidea spiraeae*, a sawfly new to Britain, Proc., 1924, cxv; 1925, xxix; photograph of R. H. tibia and tarsi of the sawfly *Pachyprotasis rapae* ♀, Proc., 1923, lii. For Teratological series.

L. W. Newman, F.E.S.: 2 dark vars. of moth *Demas coryli*, bred, Chilterns, 1924.

Shelley Coll.: 61 Lepidoptera incorporated from this Coll. and 264 from another, both remaining in cabinets purchased from Stevens, 1922.

R. South, F.E.S.: 26 vars. of the Noctuid *Sarothripus revayana*, New Forest. The forms of this very variable moth were determined by the donor and Mr. W. G. Sheldon.

Rev. C. F. Thornehill: ♀ *L. icarus* ("Common Blue") with L. wings dwarfed, Shadoxhurst, Kent, viii, 1923. For Teratological series. Also 196 moths including 1 *Orgyia fascelina*; 3 *Tryphacna orbona* (subsequea); 19 *Agrophila sulphuralis*; 8 *Coremia quadrifasciaria*, incorporated from

the Thornewill Coll., remaining in cabinet purchased from Stevens, 1924.

Commander J. J. Walker, Hon. M.A., F.L.S.: 7 ex. of Arctiid moth, *Diaphora mendica*, bred, 1925, from a New Forest parent; 2 ex. of fly *Hippobosca equina*, from cow, New Forest, vi. 1925.

F. C. Woodforde, B.A., Exeter: 12 insects, nr. Winchester, 1925, including the ♀ beetle *Drilus flavescens* in the last feeding stage, found on a window-sill. Rarely seen in England. Proc., 1925, lxiv.

From the Oxford District.

W. Burrows: 8 *Thecla pruni*, vi. 1925.

J. Collins: 142 insects of the following groups:—NEUROPTERA: the rare *Panorpa cognata* ♂, Cothill, vi. 1925, the only ex. with data in Hope Coll.; determined by Mr. W. J. Lucas. HEMIPTERA: many species including 4 *Calocoris fulvo-maculatus*, Wood Eaton, vi. 1925; ♂ *Notostira erratica in coitū* with *N. tricolorata* (determinations by the late E. A. Butler), Tubney, x. 1924. HYMENOPTERA: 38 male bees, *Halictus cyllindricus*, at rest together on 2 dry grass-heads, nr. Henwood, viii. 1905. COLEOPTERA: 7 *Smicrus filiformis*; 2 *Medon obscurus*; 7 *Calodera aethiops*, v. 1925; first 2 sp., new to Coll., Wood Eaton; 1 *Centhorrhynchus trimaculatus*, Tubney, vii. 1923. Also 1 *Anchomeuus oblongus*, Water Eaton, i. 1924, for Teratological series, Trans., 1925, p. 395. DIPTERA: include 10 *Leucoptera* sp. ? *punctum*, Woodstock, iii. 1923; 6 *Calobata ephippium*, new to Coll., Yarnton, vi. 1925; 5 *Scoptera vibrans* with puparia, bred from larvae in manure heap, Wood Eaton, vi. 1925; 1 *Caricea tigrina* and 2 *Scatophaga stercoraria* with Dipterous prey, Water Eaton, vi. 1924, and Tubney, v. 1924, respectively.

A. H. Hamm, A.L.S.: Puparium of *Gastrophilus equi*, Headington, vii. 1918; 4 species (7 ex.) of Hemiptera capt. in Univ. Museum grounds, ix. 1923; exs. of *Pyrameis atalanta* ("Red Admiral") and pupa-cases, Old Rd., nr. Shotover Hill, x. 1924, material of Proc., 1925, xv.

H. C. Hounslow: The Noctuid moth *Plusia moneta*, bred 29. v. 1919, and its cocoon, Oxford.

A. Robinson: The Pentatomid (Hemiptera) *Piezodorus lituratus*, also a green *Blatta* (cockroach), both alive in house, Walton Well Rd., x. 1923. The same sp. of *Blatta*, doubtless accidentally imported in bananas from Jamaica, was received from J. Collins and G. Tickner; another, from Mrs. Rowley, produced 14 young, v. 1924.

G. Tickner: Acarid from otter, Stadhampton, iii. 1924.

H. Trim: *Cetonia aurata* ("Rose beetle"), in Univ. Museum, vi. 1924.

Commander J. J. Walker, Hon. M.A., R.N.: The Noctuid moth *Trachea piniperda*, Tubney, iv. 1912.

THE HOPE LIBRARY.

The most interesting and valuable gift ever received by the Library is the complete series of six quarto volumes known to Entomological Science as "Jones' Icones", presented by Dr. F. Dawtrey Drewitt, M.A., D.M., F.R.C.P., Ch. Ch., and gratefully acknowledged by the vote of Convocation June 2, 1925. These unique volumes, which are in perfect condition, contain the beautiful coloured drawings and brief Latin descriptions in manuscript of all the species of butterflies known 150 years ago. Faulkner in his "History of Chelsea" (1829) wrote of the author, William Jones: "His learning and abilities were of a most superior order; he was eminently skilled in the Hebrew and Greek languages. . . . But it is in the character of a naturalist that he must be principally regarded, having painted from nature 1,500 species of butterflies in a most masterly manner, and characterized them in the Latin language, in the Linnean manner. . . . These drawings were so much admired by the celebrated Fabricius that he described from them. . . . in the last journey alone above 200 new species which he named and published. . . ." ¹ And earlier still, Sir J. E. Smith, founder of the Linnean Society, in the preface to "The Natural History of the rarer Lepidopterous insects of Georgia" (1797), acknowledged the great assistance he had received in

¹ Quoted from "The Romance of the Apothecaries' Garden at Chelsea", by Dr. F. Dawtrey Drewitt, 2nd ed., London, 1924. See pp. 81-3 for further details concerning William Jones of Chelsea and the visits of Fabricius.

the genus *Papilio* from "his accurate and liberal friend, Mr. Jones, of Chelsea, whose knowledge of that tribe is perhaps unequalled, and whose drawings are themselves the original authority for many of Professor Fabricius's recently published *Papiliones*, which were actually described from thence alone". The drawings thus described by this illustrious Dane, one of the favourite pupils of Linnaeus, during his visits to this country between 1767 and 1787, are therefore the types of the species—the final court of appeal in any difference of opinion as to the forms which bear these Fabrician names.

A bound volume of copies of figures in the "Icones" exists in the Hope Department. It is prefaced by the following statement in Professor J. O. Westwood's handwriting:—

"Donovan's Drawings of Butterflies copied from *Jones' Icones* on 76 sheets (as formerly arranged) and divided by Mr. Hope into 'Five fascicles'. (Many of these were published by Donovan in his *Naturalists' Repository*); but a great Number more Copies from Jones' 5 Volumes (which were in the Possession of Mr. Drewitt of Christ Church, Oxford, in 1872) were made by J. O. W. at that time and incorporated with Donovan's.

"Bibliotheca Entomologica Hopeiana, Oxoniae."

A pencil note records that 569 figures were copied by Professor Westwood. His statement that there were five volumes (instead of six) may have been merely a slip or may imply that he did not copy any figures from one volume. This inference can now be checked by comparison with the originals.

The following gifts have also been received: Mrs. E. K. Drummond: a valuable set of the *Journ. Bombay Nat. Hist. Soc.*

W. J. Lucas, B.A.: a nearly complete series of his papers, several of them being his last copy. They will be of great interest to students of British Neuroptera and Orthoptera.

Major Stephen L. Norris, R.E.: a series of beautiful coloured drawings of zoological subjects by his great-aunt Miss Anna Carr.

An interesting accession, purchased at one of Stevens's sales, is the copy of Chenu's "*Encyclopédie d'Histoire Naturelle*:"

Papillons, Lucas", Paris, n.d., which belonged to Alfred Russel Wallace, and was taken by him to the Malay Archipelago. It contains many manuscript notes and drawings by him; also the date 1853, accompanying his signature.

EDWARD B. POULTON.

Report of the Hope Professor of Zoology, 1926.

The Hope Collections have been, in large part, rearranged during the past year. The whole of the British Collections, together with the general collection of Orthoptera, occupy the large west room of the south upper corridor, the general collection of Lepidoptera and the Bionomic collections their old position at the south end of the west upper corridor (Old Radcliffe Library), and the general collections of all other insects the new upper room at the north end of the same

corridor. This latter room relieves the congestion in other areas and will also provide space for accessions for many years.

The changes in the heating system of the Museum Departments have had an unfortunate effect upon the rooms in the south corridor, and it is essential that the difficulty should be overcome before the next winter. Much of the usual work could not be carried on in these rooms during the past season, and a period of severe cold would have stopped it altogether.

The Collection of Pierinae.

Dr. F. A. Dixey's work on the Bourke Collection of Lepidoptera led to an extended investigation of the *pallene* group of the difficult genus *Teracolus*. This included a revision of all the specimens of this group in the collections of the British Museum and of the Hope Department, and the making of many preparations. Work was continued on the development of the "veins" and scales in the wings of a species of *Pierinae* (*G. rapae* Linn.); interesting results were obtained which it is expected will shortly be published. A lecture, delivered by request in Section D at the meeting of the British Association in Oxford, dealt with some new points in the theory of Mimicry.

Many specimens were incorporated by Dr. Dixey in the general collection. These included *Pierinae* from Lagos (Lamborn), Port Sudan (Mrs. Waterfield), Uganda (G. D. H. Carpenter), Marsabit, near Lake Rudolph (V. G. L. van Someren), Kisumu (Harrison). St. Vincent (Frampton), Chile and N. Carolina (H. J. Turner), and various localities in India and Ceylon (Ollenbach, Ormiston, and Rothney). Perhaps the most interesting accessions during the year to the Pierine series are an egg-shell and pupal case of the remarkable and isolated form *Calopieris eulimene* Klug, collected by Mrs. Waterfield at Port Sudan.

The Collection of Orthoptera.

Dr. R. Hanitsch's work has been almost confined to the Blattidae. He has been engaged in the determination and description of species from the following localities: (1) Malay

Peninsula, collected, 1921-6, chiefly by Capt. H. M. Pendlebury, of the F. M. S. Museums, Kuala Lumpur; (2) Siam, 1926, by Major W. R. Ladell, and sent by the Imperial Bureau of Entomology; (3) Annam, by C. Boden Kloss, of the Raffles Museum, Singapore: the paper is now in course of publication in Bangkok by the Nat. Hist. Soc. of Siam; (4) Deli, NE. Sumatra, about 1920, by Dr. E. Mjöberg; Lampong, S. Sumatra, 1921, by Dr. H. H. Karny, of the Buitenzorg Museum, and Dr. Siebers; Fort de Kock, W. Sumatra, 1922-5, by E. Jacobson; (5) Mentawi Is., West of Sumatra, 1924, by Dr. Karny, C. Boden Kloss, and N. Smedley; (6) China, and the Amazons (Swedish Scientific Expedition), sent by Dr. Yngve Sjöstedt, of the Stockholm Museum; (7) South Africa, by J. Hewitt, B.A., Director of the Albany Museum, Grahamstown.

The University Collection has been greatly enriched by duplicates from these collections, No. 3 having been presented as a whole. It will be realized that the work, of which the foundation was so well laid by the late Robert Shelford, is being continued with success and that Oxford is the centre consulted by museums in many parts of the world for the determination of these interesting but, to most people, unattractive insects.

The British Collections.

The convenient arrangement in one room of the fine collections of British insects has rendered them far more useful, and they are often consulted by students. Mr. F. C. Woodforde has given invaluable help in the arrangement of the principal group—the Lepidoptera. Having completed the butterflies and larger moths he has collected together and arranged the Pyralidae in one fifteen-drawer cabinet and has begun the Crambidae. In the determination of obscure and difficult species Mr. Woodforde received kind help from Mr. E. G. R. Waters, who has such an intimate knowledge of the British Micro-Lepidoptera. The arrangement of the Coleoptera was continued by Mr. Collins, with the kind help of Commander J. J. Walker, thus rendering the fine material in the Department far more available for the use of students.

Visits of Naturalists.

The meeting of the British Association in August afforded the opportunity for several naturalists to inspect the Hope Department. The following visitors have contributed specimens to the collections or in other ways helped in the work: R. Adkin, F.E.S.; H. E. Andrewes, F.E.S.; G. J. Arrow, F.E.S.; Capt. H. S. Blunt; Dr. G. D. H. Carpenter, M.B.E., D.M.; J. E. Collin, F.E.S.; W. M. Crawford, B.A., F.E.S.; H. Donisthorpe, F.Z.S., F.E.S.; Arnold Hodson, C.M.G.; G. H. E. Hopkins, M.A., F.E.S.; Dr. Walther Horn, Dr. Med.; Dr. F. W. Jackson; C. F. Johnson, F.E.S.; W. J. Kaye, F.E.S.; C. H. Lankester, F.E.S.; Dr. G. A. K. Marshall, C.M.G., D.Sc., F.R.S.; H. C. Robinson, F.E.S., Director of F. M. S. Museums; Rev. Canon K. St. Aubyn Rogers, M.A., F.E.S., Wadham; Dr. Hugh Scott, M.A., Sc.D.; H. W. Simmonds, F.E.S.; W. H. T. Tams, F.E.S.; Dr. V. G. L. van Someren, C.M.Z.S., F.L.S., &c.; Dr. R. J. Tillyard, D.Sc., F.R.S.; W. H. Thorpe; Major C. A. Wiggins, C.M.G.; H. Willoughby Ellis, F.Z.S., F.E.S.; Dr. C. L. Withycombe, Ph.D., M.Sc. Canon Rogers during his visit gave much kind help in the arrangement of the African butterflies belonging to the fine genus *Charaxes*, thus rendering the abundant material, much of which was presented by him, far more useful to the student.

Among other naturalists who have visited the Hope Department in order to study various parts of the Collection were: Dr. R. R. Armstrong, F.E.S.; Prof. W. A. F. Balfour-Browne, F.R.S.E.; Prof. Sir T. Hudson Beare, B.Sc., F.R.S.E.; P. M. Bright, F.E.S.; Prof. Royal N. Chapman, University of Minnesota; Norman H. Joy, F.E.S.; Prof. C. Lloyd Morgan, D.Sc., F.R.S.; Prof. J. P. McMurich, Toronto University; J. Shibuya, Ent. Inst. Hokkaido, Imp. Univ., Japan.

Dr. Dixey and Dr. Eltringham have, as in previous years, been engaged upon important researches, and the Hope Department has been visited for the same purpose by Dr. G. D. H. Carpenter, Mr. E. B. Ford, B.A., Mr. G. H. E. Hopkins, M.A. (Cantab.), Mr. O. W. Richards, B.A., and Dr. V. G. L. van Someren. The results of these researches

are indicated in the list of published works or will appear in the lists furnished by later reports. Dr. B. N. Schwanwitsch, of Petrograd, who came to study the evolution of butterfly markings, publishes his results in Russia.

Special mention must be made of the Catalogue of the Arachnological Library bequeathed by the Rev. O. Pickard-Cambridge, prepared by his son Mr. A. W. Pickard-Cambridge of Balliol. The wishes of the donor are now carried into effect and the resources of this splendid library made conveniently available for the student of the Arachnida.

The meeting of the Entomological Club took place on July 3-5, when the Department was visited by eleven naturalists, whose names appear in the first list in this section. The meeting was also attended by nine Oxford entomologists.

Fund for the Study of Social and Organic Evolution.

The Rev. F. C. R. Jourdain's memoir on "Parasitism in the Cuckoo" (1925), towards which a grant had been authorized, suggested and made possible the subject of the Annual Address to the Entomological Society of London in January, 1926, on the evolution of the deceptive resemblance of Cuckoos' eggs in relation to that of mimetic insects.

Miss Dorothy Garrod's volume on "The Upper Palaeolithic Age in Britain" appeared in 1926, and the Professor has been glad to authorize a grant in aid of the publication by the Clarendon Press of another valuable work—on the Rock Paintings of Southern Spain, by the Abbé Breuil—bearing directly on the Study of Social Evolution.

The fees for two lectures on the Evolution of Insects, and one on the problems of Economic Entomology in New Zealand, by Dr. R. J. Tillyard, D.Sc., F.R.S., were provided by a grant from the fund.

Certain confident statements by the charming writer and keen naturalist, J. H. Fabre, have been allowed so much weight and have been so often quoted by opponents of organic evolution, that the Professor welcomed the opportunity of assisting the Entomological Society of London to publish an intensive

study of the British Crabronidae (Fossorial Wasps), by Mr. A. H. Hamm and Mr. O. W. Richards. The authors conclude, from all available observations (including those of Mr. Hamm continued for twenty years) on these wasps and their treatment of insect prey, that the "great variation in instinct does not accord with the principles laid down so axiomatically by J. H. Fabre . . . There is now no doubt that, within certain bounds, instinct varies as much as any morphological character" (Trans. Ent. Soc., vol. lxxiv, 1926, p. 299).

The publication in 1926 of two Memoirs, one by the Professor and one by Mr. C. F. M. Swynnerton, in Proc. Internat. Entom.-Kongr., Zürich, II, 1925, on a new form of butterfly mimicry (in African species of the genus *Charaxes*), was aided by a grant.

Mr. G. H. E. Hopkins's researches in the Samoan and Tongan Islands, aided by a grant in 1925, were prepared for publication during the past year and issued 9 April, 1927, by the British Museum (Natural History).

Hope Reports.

The alteration in the size of the Entomological Society's publications, of which the separata contribute so much to the Hope Reports, will involve a corresponding change in volumes containing papers published in 1926 and subsequent years. The material for two or more, probably three, volumes of the old size is in hand, and it is proposed to issue with the last of these an index to the papers and communications in the seventeen or eighteen volumes, including the two appendices, of this first series.

Published work in 1926.

References such as (58) indicate the page of the "Proceedings of the Entomological Society of London" for 1926; such as (Tr. 333) the page of the "Transactions" of the same Society for 1926. The "Entomologist's Monthly Magazine", 1926, vol. lxii, is indicated by (E.M.M.), the "Entomologist", 1926, vol. lix, by (Ent.). The papers concerned with the Ethiopian Region are placed together, leaving those concerned with other Regions and general subjects in a single group.

Ethiopian Region.

K. G. Blair, B.Sc., F.E.S.: "W. A. Lamborn's observations on *Arsinoë grandis* (Carabidae) and other parasites of *Catantopus revoili* (Tenebrionidae), in Nyasaland" (58).

Dr. G. D. H. Carpenter, D.M., M.B.E.: "Further observations on insects in Uganda" (10, 43); "Insects collected from a sickly-looking banana-leaf, on Bukassa Isle, NW. Victoria Nyanza" (23); "Speke's Tragelaph on the Sese Isles of Lake Victoria", with an Appendix by the Professor (Proc. Zool. Soc., pt. 4, 1925, p. 1423, pl. I and Map).

W. A. Lamborn, F.E.S.: "A Nyasaland Pompilid with unusual prey—a cockroach—which completely recovered after being stung" (12); "Proof that the larva of the mimetic *Hyperichia bifasciata* preys on the larva of its Aculeate model *Xylocopa inconstans*, in Nyasaland" (44); "Observations on the Chrysid parasites of an Aculeate, probably *Synagris*, in Nyasaland" (47).

The Professor: "Protective resemblance borne by certain African insects to the blackened areas caused by Grass Fires" (III, Internat. Entom.-Kongr., Zürich, July 1925, Bd. II, p. 434, Weimar, 1926, pl. 11); "Breeding experiments on *Charaxes ethiopes* at Jinja, Uganda, by Dr. Robert van Someren, and on other di- or polymorphic butterflies at Nairobi, Kenya Colony, by Dr. V. G. L. van Someren" (ibid., p. 507, pl. 15); "Mimicry in African Butterflies of the genus *Charaxes*, with a classification of the species" (ibid., p. 518); "An account of the tailed mimetic female of *Papilio dardanus hodsoni*, taken in SW. Abyssinia by Mr. Arnold Hodson, C.M.G." (6); "The predominance of mimetic associations among the butterflies of Uganda" (21).

Rev. Canon K. St. Aubyn Rogers, M.A., Wadham: "Migration of the Pierine butterfly *Belenois mescutina*, at Nairobi" (8).

Dr. V. G. L. van Someren, F.L.S.: "Migration of the Pierine butterfly *Belenois mescutina*, at Nairobi" (8); "Further confirmation of the attacks of *Hyperichia* (Asilidae) larvae upon the larvae of Xylocopid bees, at Nairobi" (9).

Dr. V. G. L. van Someren, F.L.S., &c., and Dr. R. A. L. van Someren, M.D., &c.: "The Life-histories of certain African Nymphalid Butterflies of the Genera *Charaxes*, *Palla*, and *Euxanthe*" (Tr. 333, pls. lxxiv-lxxx).

Other Zoological Regions, &c.

C. L. Collenette, F.E.S.: "Notes on *Hypolimnias bolina* L. in the Pacific Islands" (E.M.M., p. 25).

J. Collins: "Captures of Tachinidae in the Oxford district during 1925" (E.M.M., p. 60).

Dr. H. Eltringham, M.A., D.Sc., New College: "On the Abdominal Glands in *Colaenis*, *Dione*, and *Eucides* (Lepidoptera)" (Tr. 263, pl. lxxii); "On the Structure of an Organ in the hind-wing of *Myrmeleon nostras*, Fourc." (Tr. 267, pl. lxxiii); "On a new organ in the Abdomen of *Eryphanis polyxena*, Meerb. (Lepidoptera)" (Tr. 367, pl. lxxxiv).

E. B. Ford, B.A., F.E.S., Wadham: "Zygaenidae attracted by the female of *Lasiocampa quercus*" (20).

A. H. Hamm, A.L.S., and O. W. Richards, B.A., Brasenose: "The Biology of the British Crabronidae" (Tr. 297).

G. H. E. Hopkins, M.A., F.E.S.: "Sex-ratio of *Hypolimnias bolina* in Viti-Levu, Fiji" (29).

Rev. F. C. R. Jourdain, M.A., M.B.O.U., &c., Magdalen: "A study on Parasitism in the Cuckoos" (Proc. Zool. Soc., pt. 2, 1925, p. 639, pls. i-v).

Dr. Kunhi Kannan, M.A., Ph.D.: "The proof that the larva of *Hyperechia xylocopiformis* preys upon the larva of *Xylocopa tenuiscapa* in S. India" (1, 25).

F. Laing, F.E.S.: "R. Kelly's notes on gall-formation by Australian Thysanoptera" (43).

S. Stuart Light, F.E.S.: "Ants and their Hemipterous and Ichneumonid (Cryptinae) mimics observed together at Como, Italy" (13).

Capt. H. M. Pendlebury, F.E.S.: "Notes on some Mimetic Insects from the Malay Peninsula" (37).

Dr. R. C. L. Perkins, D.Sc., F.R.S., Jesus College: "On the resemblance of a Malayan *Cerceris* (Fossores) to a true wasp (Vespidae)" (41).

A. W. Pickard-Cambridge, M.A., F.E.S., Balliol College :
 "Catalogue of the Arachnological Library bequeathed to the
 University of Oxford by the Rev. Octavius Pickard-Cambridge,
 M.A., F.R.S." Oxford, 1926.

The Professor: "The Evolution of the Colours and Patterns of
 Cuckoos' Eggs and its Relation to that of Insect Resemblances,
 such as Mimicry" (Proc. Ent. Soc. Lond., 1925 (1926), p. xcvi);
 "Thomas Henry Huxley, the Centenary Lecture delivered at
 the Royal College of Science, S. Kensington, May 4, 1925"
 ("Nature", vol. cxv, May 9, 1925, p. 704: abstract); "A rare
 Brenthid beetle introduced into England in American oak"
 (2); "The female of the leaf-like Tettigoniid, *Mimetica*, and
 a leaf-like Geometrid moth from Costa Rica, with notes by
 the captor, C. H. Lankester, F.E.S." (9); "A remarkable
 larva of *Abraxas grossulariata*" (23); "A Conopid fly
 carrying the pollinia of an Orchid" (24); "Mr. F. F. Laidlaw's
 observations on the Pigmy Falcon capturing butterflies in
 Kelantan" (32); "The Euploeine associations of the New
 Hebrides and their relation to those of Fiji" (47, 62); "Action
 of light upon insect pigments" (56, 63); "The terrifying
 appearance of the pupa of a Geometrid moth, *Dysphania*
palmyra, observed by G. M. Henry in Ceylon" (61); "A
 strangely torn butterfly's wing" (62).

O. W. Richards, B.A., Brasenose College: "Notes on the
 British species of *Lucilia* (Diptera). With a Supplementary
 Note by J. E. Collin" (Tr. 255, pls. lxviii-lxx).

Hubert W. Simmonds, F.E.S.: "The Satyrine butterfly
Melanitis leda attracted to light and entering houses, in
 Batavia" (7); "Sex-ratio of *Hypolimnias bolina* in Viti-Levu,
 Fiji" (29).

Commander J. J. Walker, R.N., Hon. M.A., F.L.S., Editor
 of "The Natural History of the Oxford District", written for
 the Oxford Meeting (1926) of the British Association. The
 following sections deal with the material of the Hope Depart-
 ment: Introduction, Coleoptera, Rhopalocera (Butterflies),
 Macro-Lepidoptera (Large-bodied Moths), by the editor;
 Orthoptera, Psocoptera, Ephemeroptera, Paraneuroptera
 (Dragonflies), Neuroptera, Trichoptera, by W. J. Lucas, B.A.,

F.E.S.; Hymenoptera, Diptera, by A. H. Hamn, A.L.S., F.E.S.; Micro-Lepidoptera (Small-bodied Moths), by E. G. R. Waters, M.A., F.E.S., Exeter College; Hemiptera, by J. Collins; Arachnida, by A. W. Pickard-Cambridge, M.A., F.E.S., Balliol College; A brief account of the Hope Department, by the Professor.

B. C. S. Warren, F.E.S.: "Preliminary description of a new Spanish race of *Powellia sao*" (Ent. Record, vol. xxxviii, 1925, p. 77).

E. G. R. Waters, M.A., F.E.S., Exeter College: "Pyralidina and Tortricina in the Oxford District" (E.M.M., p. 28).

ADDITIONS TO THE COLLECTIONS.

The Morice Collection and Entomological Library.

The great series of Palaearctic Hymenoptera together with the books, separata, and manuscript notes bearing upon the collection, bequeathed by the late Rev. F. D. Morice, M.A., Fellow of The Queen's College, is among the most important accessions ever received by the Department. The bequest also includes a large number of valuable scientific books on other groups of insects, &c., and much apparatus. The whole was safely conveyed in a motor-van by road from Woking, the expense being provided for by the testator. The collection, placed in the new room over the north end of the Old Radcliffe Library, is now available for students of the Hymenoptera.

Donations incorporated in 1926.

Many of the following donations were received before 1926.

Several accessions include the material recorded in the publications of the Entomological Society of London, referred to briefly as "Proc." and "Trans.," with the addition of the year and page. The elevation at which a capture has been made is given by a number, e. g. "6,500", feet being understood.

Ethiopian Region.

Dr. G. D. H. Carpenter, M.B.E., D.M., &c.: 85 butterflies, Kakindu, Tang. Terr. just S. of Uganda, nearly all species

of *Charaxes*, and including 1♀ *mixtus* (Proc., 1923, lxvii), 2 *etheocles*, ♀ f. *carpenteri*, including Type (Proc., 1918, lxxxii), 2♂ 1♀ *imperialis* and many other interesting forms; also, from islands in the NW. Victoria Nyanza, 12 *Charaxes* and the Type of *Polyptychus spurrelli commodus* (Sphingidae), bred i, 1913, Bugalla I. Described by Dr. Karl Jordan in 1915.

Dr. Carpenter and Major C. A. Wiggins, C.M.G.: 88 butterflies, Buamba Forest, E. side of Semliki Valley, Toro, Uganda, abt. 3,000 ft., vii, 1921, nearly all species of *Charaxes*, including 1♂ *imperialis*, 4 *kahldenii* (new to the Collection), and many other interesting species. Part of the collection, made on a visit to this important and insufficiently studied locality, rendered possible by the aid of the Fund for Promoting the Study of Evolution (Proc., 1922, lxvi, lxvii).

J. J. Joicey, F.L.S.: a valuable series of 35 butterflies from S. Thomé I., W. Africa, collected i-iii, 1926, by T. A. Barns. The following local species or races are included:—*Hypolimnias salmacis thomensis*, *Charaxes candiope thomasi*, ♂ *C. brutus antiquus*, *C. monteiri*, *Neptis eltringhami* (Paratypes), *Crenis boisduvali insularis* (Paratypes), *Acraea niobe*, *A. zetes zalema*, *A. insularis*, *A. newtoni*, ♂ *Papilio leonidas thomasi*. The remarkable effects of isolation are evident in the above peculiar forms, each of which, except when otherwise indicated, is represented by both male and female. Mr. Joicey also presented two of the rare females of *Charaxes anticlea*, from the Ivory Coast and Angola (the latter of the race *adusta*).

W. A. Lamborn, F.E.S.: an example of *Euphaedra zadachi*, Chinteché, W. Nyasa, vii, 1926 (P. Topham). The great mass of the fine material presented by the generous donor has not been distributed throughout the collections, but kept together so as to be more conveniently available for investigation.

Rev. Canon K. St. Aubyn Rogers, M.A., Wadham: the following fine accessions were collected in W. Kenya Colony: 8 butterflies, including 2 ♂ *Charaxes xipharex nandina*, 1 fine *Precis sesamus* (intermediate form), 1 *Acraea equatorialis anaemia*, 12 moths much wanted by the collection, forests near Nairobi (5,500), iv, v, 1923; 45 butterflies, including 3

Amauris ansorgei, 1 *Pap. mackinnoni*, and many other species much wanted for locality, Lumbwa, m. 514 on Uganda Ry. (7,000), vi, 1923; 13 butterflies, chiefly Acraeinae, Kisumu, NE. Victoria Nyanza, vii, 1924; the remaining specimens were taken, vi, 1924, at localities within 40 m. of Kisumu: 14 butterflies, including 3 *Acraea cinerea*, 2 *A. asboloplintha*, 1 *A. disjuncta*, 1 *Planema quadricolor*, Kaimosi (5,000); 17 butterflies, Maseno (5,000); 15 butterflies, including 2 *Hypolimnias dinarcha*, 1 ♂ *Planema poggei*, 1 ♂ *Acraea orcas*, Butere (4,500).

Lord Rothschild, Ph.D., F.R.S.: 2 Danaine butterflies specially needed by the collection—a ♂ paratype of *Amauris niavius aethiops*, Kaffa, Abyssinia, vi, 1901 (O. Neumann); a ♂ *A. a. ansorgei*, compared with the type of this species, Pt. Alice (=Entebbe), vi, 1894 (Dr. Ansorge).

Dr. R. A. L. van Someren, M.D., &c.: The following have been incorporated from a large collection of butterflies purchased from Dr. van Someren on his leaving Uganda—the Type and 2 Paratypes of the ♀ form *vansomerni* of *Charaxes ethiops*, Buyala, near Kampala, ii, 1924; the Type and 2 Paratypes of the ♀ form *castoroides*, and 6 ♂ of *C. ctesipe*, Jinja, N. shore Victoria Nyanza, bred v, vi, 1924.

Dr. V. G. L. van Someren, M.B.O.U., F.L.S., &c.: the following interesting specimens from Kenya Colony and Uganda have been incorporated, ♂ Type and ♀ Paratype *Charaxes blanda kenya*, Sokoke Forest, E. coast Kenya, ii, 1921; a remarkable and unique variety of the dry form of *Preccis sesamus* (Proc., 1923, p. lxi); 10 specimens, forming the material of Dr. Eltringham's paper on the life-history of the Lycaenid butterfly *Mimacraca marshalli dohertyi* (Trans., 1924, p. 152), 2 *Amphicallia tigris*, a Hypsid moth, with its larva mimicked by one form of the butterfly larva *Antanartia hippomene*, also a larva of the other non-mimetic form (Proc., 1924, p. xi), 14 *Dorylus nigricans burmeisteri*, "Driver Ant" (*ibid.*, p. ix), 1 Dipteron, *Rhingia* sp.—Nairobi (about 5,500), various dates; Type and Paratypes with 2 pupa-cases of a new race of *Amauris ansorgei* described by the donor in Journ. E. Africa and Uganda N. H. S., No. 21, p. 44,

♂ ♀ *Charaxes fulvescens*,? *acuminatus*, Kikuyu Escarpment, near Uplands, Uganda Ry. (7,500–8,000), iii, iv, 1926; a fine series of *Acraea terpsichore rangatana*, Kinangop, Aberdare Range (8,000–9,000), bred iv, 1926: it is of great interest that this *Acraea* should have been proved to occur as a local race at Kinangop; Type and 2 Paratypes of the ♀ form *protocedreatis* of *Charaxes etheocles*, Jinja, Uganda, vi, vii, 1923. This is a most interesting new ♀ form leading towards the peculiar mimetic ♀ *cedreatis*.

Lt.-Col. R. S. Wilson, F.E.S.: Paratype of *Polyptychnus grayi niloticus* (Sphingidae), Talodi Range, Nuba Mtns. Prov., Sudan, vii, 1918: described by Dr. Jordan in Nov. Zool., vol. xxviii (1921).

Other Zoological Regions.

H. Britten, F.E.S.: a valuable series of 12 Coleoptera (Trichopterygidae) collected on the Seychelles Expedition, including Paratypes of six species described by the donor.

A. E. Burras, F.E.S.: an interesting series of 30 butterflies and 34 moths, Névache, Hautes Alpes, viii, 1923.

Dr. H. H. Corbett: 3 Longicorn Coleoptera, Archangel, v, 1919.

A. F. Evetts: a very fine series of 288 butterflies of all the Indian families and subfamilies, Netraconda, Balehonnur, W. Ghats (2,800–3,800), 1908–1915. The locality renders this series of especial interest.

Rev. R. E. E. Frampton: 23 butterflies, Chateaubelair distr., St. Vincent, W. Indies, iv, 1895.

Dr. R. Hanitsch, Ph.D.: a collection of Blattidae from Trial Bay, N.S.Wales, made by Hans Overbeck, formerly of Singapore, whilst prisoner of war, 1914–1919.

Newnham College: a series of 58 Membracidae (Homoptera) collected by Maud D. Haviland (Mrs. H. H. Brindley) in British Guiana, and including 13 Paratypes of species described in her memoir in *Zoologica*, vi, No. 3, p. 229, New York. A very valuable addition to the fine collection of this most interesting group.

Dr. C. H. T. Townsend: 13 Lepidoptera, Bellavista (about

1,100), Rio Huallaga, Peruv. Amazon: the locality gives great interest to the specimens.

Commander J. J. Walker, R.N., Hon. M.A.: the Sphingid moth *Cocquosa triangularis*, Sydney, N.S.W., from pupa, ii, 1901: a welcome addition to the collection of Hawkmoths.

Additions to the British Collections.

E. D. Bostock, F.E.S.: 14 *Polyommatus icarus*, The Lizard, vi, 1925; 2 *Cucullia gnaphalii*, N. Kent, vii, 1925.

Dr. G. D. H. Carpenter, M.B.E., D.M., &c.: 93 insects, chiefly Coleoptera, Fowey, Cornwall, viii, ix, 1926. Of much interest on account of the locality.

J. Collins: 2 ♀ *Argynnis aglaia*, Watlington, viii, 1919.

Col. C. Donovan, late I.M.S.: 45 Lepidoptera, various dates, including 2 *Acronycta myricae*, 3 *Dianthoecia caesia*, 5 *D. capsophila*, 8 *Nonagria sparganii*, Co. Cork (bred); 2 *Hydroecia petasitis*, Bourton-on-the-Water (bred). A very welcome accession.

G. H. E. Hopkins, F.E.S.: 2 interesting vars. *Hcodes phlaeas*, Stalham Broad, Norfolk, viii, 1911, and St. Albans, abt. 1905 (capt. A. Dickinson).

H. E. F. Onions: an interesting pale yellowish var. ♀ *Pieris napi*, Sedburgh, v, 1919.

The Professor: 37 miscellaneous insects, Oxford and St. Helens, I. W., 1918-19; 3 *Thecla betulae* with pupa-cases, from larvae on sloe, Oxford district, v, 1919.

W. W. Taylor, M.A., Queen's: an interesting series of Cynipidae and Braconidae, bred, v, 1919, from Oak-galls, Wytham, Oxford, iv, 1919; also of Braconidae, bred from larvae of *Geometra papilionaria*, Tubney, Oxford, v, vi, 1919; also a bred plume-moth and its cocoon.

Rev. C. F. Thornehill, M.A.: the ♀ parent with 3 offspring, bred 1917, *Spilosoma mendica*, Tubney; also an Ichneumonid, bred, vi, 1918, from larva *Eupithecia pimpinellata*, Tubney, v, 1918.

Commander J. J. Walker, R.N., Hon. M.A., F.L.S.: 8 *Polyommatus icarus*, Killarney, viii, 1926; ♂ ♀ of the rare

Pyralis lienigialis, Oxford, viii, 1906, vii, 1911 (E.M.M., vol. 43, p. 16; vol. 47, p. 192); other British insects include 2 examples of a local beetle, *Agaricophagus cephalotes* (Anisotominae), much wanted in the collection.

F. C. Woodforde, B.A., F.E.S., Exeter: a series of Braconidae (with their cocoons), bred from the larva of *Bombyx rubi*, New Forest, x, 1913.

The Hope Library.

The donations in 1926 have been as numerous as in recent years, and, if the Morice library be included, far beyond the average. Special mention must be made of a valuable gift by an old friend of the Hope Department, Col. J. W. Verbury, who has now presented the following works which used to accompany him on his visits to Oxford for the study and arrangement of the Diptera—H. Loew, *Europæan Helomyzidae*, Breslau; *Neue Beiträge zur Kenntniss der Dipteren*, Berlin, 1853; J. R. Schiner, *Fauna Austriaca. Die Fliegen*, I and II, Vienna, 1862 and 1864; *Catalogus Systematicus Dipterorum Europæ*, Vindobonac, 1864. Col. Verbury also presented a separatum of E. Y. Watson's "Indian Pierinae", Bomb. Nat. Hist. Soc., vol. viii.

EDWARD B. POULTON.

Report of the Hope Professor of Zoology, 1927.

The work of the Hope Department has been greatly facilitated by the rearrangement of the collections, effected in 1926, and by the additional space provided in the new upper room at the north end of the west corridor. The convenient arrangement of the British collections has been especially appreciated by many students.

Telephones communicating with other departments have been fixed in two places. The defects of the heating system in the large room at the west end of the south upper corridor, referred to in last year's report, have fortunately been remedied, so that work could be continued during the severe cold of last winter.

The Collection of Pierinae.

Dr. F. A. Dixey continued his study, now approaching completion, of the development of the wings in Lepidoptera. This has involved a revision of the work of previous authors, Semper, Schäffer, Spuler, Mayer, Gonin, and others. He has worked out collections of *Pierinae* from Kuala Lumpur, Kenya Colony, Mysore, Southern Nigeria, &c.; incorporating many specimens in the General Collection. Among the most interesting of these is a pair of the very remarkable mimetic form *Prioneris sita*, Feld., not hitherto represented in the collection by continental specimens, and a female of *Hyposcirtia*

narendra, Moore, a form allied to the genus *Catophaga*, of which the Hope Collection had previously possessed only one example.

The Collection of Orthoptera.

Dr. R. Hanitsch has (1) published a paper on the Blattidae of S. Annam (p. 7), referred to as in preparation in last year's Report; (2) completed and sent to Singapore for publication the MS. of "Mentawi Blattidae": the collection, made by Dr. Karny and Messrs. Boden, Kloss, and Smedley, comprises about 1,000 specimens and includes 53 species, of which 20 with one genus are new: all the types and one-third of the rest of the collection to be retained in the Hope Department; (3) started to work out a small collection of Blattidae made in 1918 by Messrs. H. J. Snell and H. P. Thomasset, in Rodriguez, and sent to the Hope Department by Dr. Hugh Scott, until recently Curator of the Entomological collections at Cambridge; (4) named a small collection of Blattidae for the Berlin Museum, and of Orthoptera for the Albany Museum, Grahamstown.

Dr. H. H. Karny, of the Buitenzorg Museum, Java, spent a week in Oxford, studying the Gryllacridae, especially the types of Griffini, and those of Francis Walker in the Saunders Collection.

Dr. Willy Ramme, of the Berlin Museum, also paid a short visit in order to study the same group.

The British Collections.

The illness of Mr. F. C. Woodforde, which has prevented him from visiting the department for many months, recalls his invaluable help in the development and rearrangement of the British Macro-Lepidoptera—the part of the collection consulted more than any other, and especially by junior members of the University.

Professor E. G. R. Waters has given much kind assistance with the Micro-Lepidoptera, the group in which he is so eminent an authority. Commander J. J. Walker has continued the kind help he has given for many years in the arrangement

of the Coleoptera as well as in many other parts of the collection—British and foreign.

In referring to the British Coleoptera special mention must be made of the fine series of accessions (p. 12) due to the generosity of Mr. Horace Donisthorpe; also to the gift, by the members of the "Entomological Club", founded in 1826,* of the Diptera (except the types, presented to the British Museum), Hymenoptera, and the types of the Lepidoptera, in their collection. The specimens are unfortunately without data, but their determinations, by some of the most distinguished British authorities of the last century, possess an historic interest, and are being recorded on special labels. Mr. Hamm and Mr. Collins went twice to London in order to transfer these old and delicate specimens from the Club cabinets, and bring them safely to Oxford. Mr. Hamm also travelled to Newton Abbot in order to convey a part of the Morice Collection of British Tenthredinidae ("Sawflies") for investigation by Dr. R. C. L. Perkins, F.R.S.

Visits of Naturalists.

The following visitors have contributed specimens to the collections or in other ways helped in the work: R. Adkin, F.E.S.; H. E. Andrewes, F.E.S.; Professor Sir T. Hudson Beare, F.E.S.; E. D. Bostock, F.E.S.; W. S. Bristowe; P. A. Buxton, M.A., F.E.S.; J. E. Collin, Pres. Ent. Soc.; B. H. Crabtree, F.E.S.; H. Donisthorpe, F.Z.S., F.E.S.; H. Willoughby Ellis, F.Z.S., F.E.S.; J. C. F. Fryer, M.A., F.E.S.; W. A. Lamborn, F.E.S.; H. Macc, F.E.S.; K. J. Morton, F.E.S.; F. Muir, F.E.S., of Honolulu; B. B. Osmaston, M.B.O.U.; A. W. J. Pomeroy, F.E.S., of Accra; Professor R. C. Punnett, M.A., F.R.S.; Dr. Hugh Scott, Sc.D., F.L.S.; W. C. Simmons, F.G.S.; W. H. T. Tams, F.E.S.; H. J. Turner, Librarian Ent. Soc.; Miss A. G. Vinall; C. J. Wainwright, F.E.S.; Dr. J. Waterston, D.Sc., F.E.S.; Major C. A. Wiggins, C.M.G.

Dr. Dixey's and Dr. Hanitsch's researches have been described in separate sections, Dr. Eltringham's in the list of

* For the history of the Club, see "Entomologist", xxv, 1892, p. 4; xxxii, 1899, pp. 160, 224.

publications, although without mention of the time and skill freely given in helping on the work of other naturalists. Dr. A. B. Gahan, of the U.S. Nat. Museum, Washington, visited the Department with Dr. Waterston in order to study the types of Chalcididae (Hymenoptera); Dr. H. H. Karny and Prof. W. Ramme those of the Gryllacridae (Orthoptera); Prof. R. Willstätter, of Munich, gave valuable advice as to the best methods to be pursued in work upon the fluorescent yellow pigment of many Lepidoptera.

The Department has also been visited by the following naturalists and other scientific friends desirous of seeing some part of the collections: Prof. H. E. Armstrong, F.R.S.; Prof. W. A. F. Balfour-Browne, F.R.S.E.; H. F. Barnes, Rothamsted Experimental Station; Prof. W. Garstang, M.A.; Sir R. Gregory; G. S. Greene, Gold Coast; Mr. Douglas Melin, Upsala; N. Yagi, Kyoto Imp. Univ. Japan.

The meeting of the Entomological Club took place on July 16-18, when the Department was visited by eleven naturalists, whose names appear in the first list in this section. The meeting was also attended by nine Oxford entomologists.

Fund for Promoting the Study of Social and Organic Evolution.

A grant of £50 was made towards the publication by the University Press of the Abbé Breuil's book—"Rock Paintings of Southern Andalusia", describing a Neolithic and Copper Age Art Group.

Mr. G. H. E. Hopkins' memoir on his researches, aided by a grant in 1926, is referred to in the list of 1927 publications.

A small grant was made for the illustration, in Plates II and III of Proc. Ent. Soc. Lond., Vol. I, 1926 (1927), of Dr. V. G. L. van Someren's remarkable gynandromorphs of *Papilio dardanus*, produced by mechanical shock administered to the freshly formed pupa.

Two lectures by Prof. W. D. Matthew, Ph.D., F.R.S., on Mammalian Evolution as revealed by the Palaeontological record, were subsidized by the Fund.

A grant of £50 was authorized towards the purchase of

Mr. H. Donisthorpe's unique collection of ants and the insects associated with them, together with the notes and publications on this outstanding problem of organic evolution.

Hope Reports.

The pressure of work in other directions has hitherto prevented the preparation of an index to first series of Hope Reports referred to in 1926. In the meantime material for future volumes is rapidly accumulating.

Published work in 1927.

References such as (50) indicate the page of the "Proceedings of the Entomological Society of London" for 1927, vol. ii; such as (Tr. 269) the page of the "Transactions" of the same Society for 1927, vol. lxxv. The "Entomologist's Monthly Magazine", 1927, vol. lxiii, is indicated by (E.M.M.). The papers concerned with the Ethiopian Region are placed together, leaving those concerned with other Regions and general subjects in a single group.

Ethiopian Region.

Lt. H. Beardmore: "A note on the migratory flight of *Libythea labdaca*, Westw., in Nigeria" (50).

Dr. G. D. H. Carpenter, D.M., M.B.E.: "Observation on the epigamic use of its anal brushes by the male *Danaïda chrysippus*, L., in E. Madi, Uganda" (44); "Two collections of Butterflies from the South-east corner of the Sudan" (82), communicated in 1927; to appear in the Transactions for 1928.

Miss M. E. Fountaine, F.E.S.: "An all-female family of *Mylothris spica*, Möschl., reared from a company of larvae at Buca in the Cameroons" (75).

W. A. Lamborn, F.E.S.: "Observations on the prey of an Asilid fly in Nyasaland" (12).

G. F. Leigh: "Injury seen to be inflicted on the ♀-f.

trophonius, Westw., of *Papilio dardanus cenea*, Stoll, at Durban" (11).

Capt. C. R. S. Pitman, Game Warden of Uganda: "Further note on the migratory flight of *Beltnois mesentina*, Cram., observed in Kenya Colony in January and February, 1926" (43).

The Professor: "A new tailed female form of *Papilio dardanus hodsoni*, Poult., taken by Mr. Arnold Hodson, C.M.G., in W. Abyssinia" (10); "Evidence of attack, probably by a bird, on the Nymphaline butterfly *Euxanthe tiberius*, Gr.-Sm., in E. Africa" (11); "The form *fulvescens*, Oberth., of *Acraea johnstoni*, Godm., bred by Canon K. St. Aubyn Rogers from a company of larvae which also yielded other forms" (29); "The clearing up of an uncertainty concerning one of the gynandromorph *Papilio dardanus*, Brown, experimentally produced by Dr. V. G. L. van Someren" (34); "Some Papilios taken at Djem-Djem in Central Abyssinia by Dr. Hugh Scott" (35); "A new *Planema* (*Acracinae*) entering the Uganda association with *Pl. macarista*, E. M. Sh., as its central model" (36); "A *niavoides*, Kheil, female of *Papilio dardanus hodsoni*, Poult., with exceptionally long 'tails', taken in SW. Abyssinia by Arnold Hodson, C.M.G." (49); "The scent-brands of male Danaine butterflies in 'papers' attacked by pests" (58); "Forms of *Danaida chrysippus*, L., collected by Miss M. E. Fountaine in Teneriffe and on the west coast of Africa" (59); "Mimetic associations of Lepidoptera taken in August, 1926, on Kome Island, NW. Victoria Nyanza, by Mr. and Mrs. W. C. Simmons" (60); "Pairs of *Danaida chrysippus*, L., and of three Acracine species, taken in coitù at Zaipi, E. Madi, N. Uganda, by Dr. G. D. H. Carpenter" (68); "Male butterflies drinking on a road in Uganda" with notes by Dr. R. van Someren, M.D. (88); "An unusually large *Acraca* from the Cape Town district" (89); "Some enemies of butterflies observed by Mr. C. B. Williams in the Tanga district, E. Africa" (89).

Dr. V. G. L. van Someren, F.L.S., M.B.O.U.: "Sex-ratios and form-ratios in eight families of *Acraca csebria*, Hew., bred at Nairobi, Kenya Colony," with notes by the Professor (5).

Other Zoological Regions, &c.

H. W. Andrews, F.E.S.: "British Asilid flies and their prey," with notes by the Professor (13).

Stanley W. Bromley: "Some North American Asilidae; their models and their prey" (54).

J. Collins: "Captures of Diptera near Oxford in 1926" (E.M.M., p. 38); "*Sarcophaga villeneuvei*, Böttch., a new British fly" (E.M.M., p. 92).

Dr. H. Eltringham, M.A., D.Sc., New College: "On the Brush Organs in the Noctuid Moth *Laphygma frugiperda*, Sm. and Abb." (14) (Tr. 143, pl. xiii).

Dr. R. A. Fisher, Sc.D.: "On some Objections to Mimicry Theory, Statistical and Genetic" (46) (Tr. 269).

A. H. Hamm, A.L.S.: "Observations on the selection of a resting-site by *Vanessa io*, L." (38).

Dr. R. Hanitsch, Ph.D.: "On a Collection of Blattidae from Southern Annam" (Journal of the Siam Society, vol. vii (1927), pp. 7-48, with 18 text-figs.).

G. H. E. Hopkins, M.A., F.E.S.: "Butterflies of Samoa and some neighbouring Island-groups", 4 plates, 1 text-fig.; in "Insects of Samoa", pt. iii, Lepidoptera, Fasc. 1, published by the Trustees of the British Museum.

C. H. Lankester, F.E.S.: "Scent-tufts observed in the males of certain Costa Rican Lepidoptera" (74).

Dr. J. G. Myers: "The habits and prey of three Asilidae in New Zealand" (54).

Dr. R. C. L. Perkins, M.A., D.Sc., F.R.S., Jesus College: "Four gynandromorphs of the rare bee *Nomada lathburiana*, Kirb., parasitic on the bee *Andrena cineraria*, L., taken in three visits to a single colony of the latter in Devonshire" (50).

The Professor: "On Certain Effects of Shock upon Insect Development", pls. ii, iii, Presidential Address to the Entomological Society of London, read 19 Jan. 1927 (Proc., 1926, vol. i, p. 71); "An early record by R. C. L. Perkins of the scent of the male *Pieris napi*, L., in England" (24); "The northern race of *Aglaia urticae*, L." (25); "Brilliantly golden

pupae of *Aglaia urticae*, L., normally produced on green leaves and stems" (27); "Diptera and Hymenoptera taken in two hours on the windows of a house at Seaview, Isle of Wight" (30); "The fertilization of Orchids of the genus *Ophrys* by males of Hymenoptera Aculeata" (31); "Mendelian inheritance of a remarkable pale variety of larva in *Abraxas grossulariata*, L." with a note by Prof. R. C. Punnett, F.R.S. (68); "An adaptation which tends to prevent in-breeding in certain Lepidoptera" (75); "Notes on *Laternaria* (Fulgoridae) and other 'Lanthorn-flies'" (86).

Professor R. C. Punnett, F.R.S.: "On the courtship of a Danaine butterfly in Ceylon" (44).

O. W. Richards, M.A., Brasenose: "The Specific Characters of the British Humble-bees (Hymenoptera)" (46) (Tr. 233, pls. xxii-xxv, 5 text-figs.); "New species of *Limosina* (Diptera) allied to *L. crassimana*, Hal." (E.M.M., p. 34); "Capture of *Ocyusa nigrata*, Fairm. et Lab., near Oxford" (E.M.M., p. 91).

Champion B. Russell, M.A., University: "The education of birds and its bearing on the warning and mimetic colours of insects" (16).

J. A. Simes, F.E.S.: "British Birds attacking butterflies" (12); "A dragon-fly captured by another and larger species" (14).

Hubert W. Simmonds, F.E.S.: "Sex-ratio of *Hypolimnas bolina*, L., in Viti-Levu, Fiji" (5); "Notes in 1927 on the abundance, proportion of the sexes, and courtship of *Hypolimnas bolina*, L., in Fiji" (71).

W. H. Thorpe, B.A., of the Zoological Laboratory, Cambridge: "The Larvae and Pupae of the genus *Hyperechia* (Diptera, Asilidae)" (23) (Tr. 177, 19 text-figs.).

Commander J. J. Walker, Hon. M.A., F.E.S.: "A British example of *Cryptocephalus primarius*" (33); "Some Insects of Historic Interest in the Dale Collection of Lepidoptera at Oxford" (E.M.M., p. 123).

Prof. E. G. R. Waters, M.A., F.E.S.: "Tineina in the Oxford District (continued)" (E.M.M., pp. 69 and 99); "Notes on the Coleophorinae" (E.M.M., p. 182).

ADDITIONS TO THE COLLECTIONS.

Donations incorporated in 1927.

Many of the following donations, received before 1927, are indicated by the year, e.g. (1924), following the name of the donor. When no date is thus inserted 1927 is to be understood.

Several accessions include the material recorded in the publications of the Entomological Society of London, referred to briefly as "Proc." and "Trans.", with the addition of the year and page. The elevation at which a capture has been made is given by a number, e.g. "3,500", feet being understood.

Ethiopian Region.

Dr. N. Chrystal: Cocoon of the moth *Gonometa* sp., almost certainly *sjöstedti* (Lasiocampidae), Zaria Station, N. Prov., Nigeria.

G. F. Leigh (1924): female f. *trophonius* of *Papilio dardanus cenea* seen to be attacked by a bird and exhibiting a characteristic injury to the hind wings, Durban, May 1924 (Proc., 1927, p. 11).

B. B. Osmaston, M.B.O.U.: 11 male butterflies, part of a crowd drinking at mud on the road between Kampala and Mubende, Uganda, 13 May 1927; also an unusually large male of *Acraea anacreon*, near Cape Town, November 1926 (Proc., 1927, pp. 88, 89).

Capt. C. R. S. Pitman, Game Warden of Uganda (1926): 7 male Danaine butterflies, 5 *Amauris echeria*, 2 *A. albimaculata*, with the scent-patches on the hind wings eaten out by "pests", probably the little red house-ant. From Cherangani, 40 m. E. of Mt. Elgon, Kenya Colony, Jan., Feb. 1925 (Proc., 1927, p. 43).

W. C. Simmons, F.G.S., and Mrs. Simmons: the series of butterflies, with a few moths, made by the donors on Kome Island, NW. Victoria Nyanza, in August 1926. The great interest of the collection is in the mimetic associations, which have been described in detail (Proc., 1927, pp. 60-3). The comparison between these associations and those previously collected by Dr. G. D. H. Carpenter in the same island is most

instructive. Also, presented by the donors, an interesting male *Danaine* which appears to be intermediate between *Amauris hecate* and *dira*, from Kakiri (4,000), 40 m. NW. of Kampala, Uganda, Dec. 1926.

Dr. V. G. L. van Someren, M.B.O.U., &c. (1922): 18 Uganda butterflies, taken 1921, including 5 *Neptis poultoni*, 5 *Neptis* sp. shortly to be described by Dr. Eltringham, 2 *Acraea humilis*, 6 *Tanuetheira timon*, Uganda race—all these much wanted in the collection; (1924) the insect food of a larval Ascalaphid, *Allocormodes kolbei* (Neuroptera), also the insects refused, showing that the preferences of these predaceous larvae are very similar to those of birds, reptiles, &c. This series of about 50 specimens, including the Ascalaphids, illustrates the experiments, conducted by the donor at Nairobi (Proc., 1924, lix).

Other Zoological Regions.

Dr. W. Armstrong (1926): 18 Lepidoptera from Tanna Island, one of the southernmost of the N. Hebrides. The 7 Euploeas of two species, especially interesting in relation to those of the more northern N. Hebrides and of Fiji, are recorded with those collected in Tanna Island by Commander Walker in 1900 and Dr. P. A. Buxton in 1925 (Proc., 1926, pp. 47-54).

E. Bullock (1923): 8 butterflies from Hong Kong, including a female *Charaxes marmax*, a pair of *Lycenopsis puspa*, a male *Cyaniris albocerulea*, and a male *Melanitis phedima bela*—all very welcome accessions.

A. E. Burras (1926): 83 Lepidoptera and 1 Dipteron from the Pyrenees, Aug., Sept. 1926, collected at Luz, about 3,500 ft. and Barège about 7,500 ft.—an interesting and varied series.

C. L. Collenette (1922): 2 butterflies, *Melanitis leda* and *Clerome arcesilaus*, the hind wings showing characteristic injuries due to the attacks of enemies, Java, April 1922.

H. St. J. K. Donisthorpe (1912): 8 *Oecophylla smaragdina*, the tree-ant, collected at Peradeniya, Ceylon, Jan. 1912, by Mr. E. E. Green, one of the first to discover the fact that the mature forms of these ants employ their larvae as sewing machines to spin together the leaves of the nest.

Dr. H. Eltringham, M.A., D.Sc., New College (1925): 126 Lepidoptera and 11 other insects from the neighbourhood of Zurich and Lakes Lugano and Maggiore, July, Aug. 1925—an interesting series mostly in beautiful condition. Two butterflies show characteristic injuries due to bird- or lizard-attack.

Miss Marjorie Fox (1926): 56 insects of various groups from Pa-Ta-Ch'u, Western Hills, 200-300 ft., 12 m. W. of Peking, July to Sept. 1926—a very interesting little collection with excellent data.

Reginald Heath: 10 butterflies, collected at Colon, Panama, and in Trinidad, B.W.I., 1909, by the late Mr. R. H. Heath.

Capt. A. F. Hemming, C.B.E., F.E.S.: 8 butterflies of great interest, chiefly from the Transjordan area, two species (*P. loewii gigas* and *Aphanitis bellatrix*) represented by examples of the first captures in that country. The true position of some of the 6 species has been recently determined by the donor.

G. M. Henry: the remarkable larva of a Jassid (Homoptera) from Haputale, Ceylon, Oct. 1927. The long cerci and eye-spots at the posterior end of the body bore in life a mimetic resemblance to the antennae and eyes of a Capsid bug (Hemiptera). The larva is being described and figured by Mr. W. E. China (Proc., 1918).

Dr. K. Kunhi Kannan, M.A., Ph.D.: 3 *Hyperechia xylocopiformis* (Asilidae, Diptera), bred from larvae which had preyed upon those of the model (a xylocopid bee) in their tunnels through the wood of *Eugenia jambolana*, Bangalore, S. India. This remarkable relationship between model and mimic was first established in Africa by Dr. V. G. L. van Someren and then in India by Dr. Kunhi Kannan (Proc., 1916, p. 1).

C. H. Lankester, F.E.S.: a female of the rare *Mimetica tuberala* (Tettigonidae, Orthoptera) from Cartago, Costa Rica, Oct. 1927. The specimen, the first green female taken by the donor, was found among dead leaves at the base of an Orchid.

Dr. R. C. L. Perkins, M.A., D.Sc., F.R.S., Jesus College: a splendid series of Hawaiian wasps of the genus *Odynerus*. These are now added to the fine Hawaiian collection presented

many years ago by the same generous donor, and kept separate as one of the most interesting island faunas in the world.

The Professor (1926): 9 Neuroptera from the Norwegian fiords, July 1926, the species kindly determined by Mr. K. G. Blair and Mr. W. J. Lucas.

In addition to these donations Mr. Doncaster's extensive private collection of moths was purchased for the Department—the species determined by careful comparison with the series in the British Museum.

Additions to the British Collections.

J. Collins: 52 Diptera from various localities in the Oxford district, much wanted by the collection; also (1918) 11 specimens of the beetle *Atomaria zetterstedtii* (Cryptophagidae), from Sallow catkins, Yarnton, May 1918 (E.M.M., 1918, p. 155).

H. St. J. K. Donisthorpe: The British Coleoptera presented by the generous donor over a long series of years included, up to 17 January 1928, no less than 2,222 species, of which 13 new to the Hope Collection and over 750 specimens were received in 1927. An element of great interest is the remarkable series from Windsor Forest—563 species—the examples of which are clearly distinguishable in the British Collection by means of a special label. In addition to the above, 66 insects of other Orders, including an Asilid fly and its Dipterous prey, Cholsey, Berks. (July 1927), and Diptera bred from a hawk's nest. Also presented in earlier years but incorporated in 1927: 46 Coleoptera from Ireland (1905); 50 (1913), including an interesting series from Lundy Island, taken in June of that year; 37 of various groups (1914), including the Fossorial wasp *Mellinus arvensis* and 4 predaceous Diptera, all with Dipterous prey, and a series of the ant *Prenolepis longicornis* from Kew Gardens; 50 of various groups (1920), including, a new species of Capsid, *Megacoelum beckeri* (Hemiptera) taken with *Formica rufa* at Weybridge, and the Chalcid-parasite *Pteromalus endomychi* bred from the beetle *Endomychus coccineus*, at Bristol.

Rev. H. D. Ford (1918): 13 Coleoptera and 2 moths from the Carlisle district.

Reginald Heath: a fine collection of Coleoptera chiefly made by the donor between 1886 and 1891, when at school at Ackworth in the West Riding, 8 miles east of Wakefield. Most of the specimens were captured at Ackworth and other localities near—Askern, Hemsworth, Broc-o-dale, and Upton Beacon; others at various localities in Yorkshire, Cumberland, Essex, Hampshire, and in the London and Exeter districts. The data are precise and detailed, and, inasmuch as there are not many examples of each species, the whole collection of 744 specimens has been incorporated. Many of the species are interesting local forms.

J. A. Simes (1926): 3 of the wings of *Aglais urticae* ("The Small Tortoiseshell"), stripped off by a Pied Wagtail, Sandown, I.W., September.

Commander J. J. Walker, Hon. M.A.: the very rare moth *Crambus craterellus* (*rorellus*), taken at Sheerness, July 1868; 2 specimens of the rare Elaterid beetle *Athous rhombeus*, bred from larvae in rotten wood, New Forest, June 1918 and 1924.

In addition to the above the British Collection of Diptera has been enriched by 3,470 specimens presented by the Entomological Club. The historic interest of this accession has been referred to on p. 3.

From cabinets (which contained the Ingall Collection) purchased from St. Bartholomew's Hospital, over 1,100 Coleoptera and 115 Lepidoptera were selected and incorporated. An account of the Ingall Collection is published in "Entomologist", vol. 28, 1895, p. 40, and Nat. Hist. Mag. Brit. Mus., vol. i, No. 7, 1927, p. 44. Although the most valuable specimens had been given to the Natural History Museum, many insects bearing data of great interest remained in the drawers, e.g. 3 *Colias hyale* ("Pale Clouded Yellow") from St. Osyth, Essex, 1842; 2 *Catocala sponsa* ("Dark Crimson Underwing") labelled "Windsor Forest"; a *Polygonia calbum* ("Comma Butterfly") and *Argynnis aglaia* ("Dark Green Fritillary") are both labelled "above 50 years old", so

that their age as specimens is considerably over a century ; 4 *Acronycta tridens* (The "Dark Dagger" Moth), labelled "Bred. H. D."—almost certainly the celebrated entomologist, Henry Doubleday ; a *Phorodesma smaragdaria* ("Essex Emerald") must be one of the earliest bred specimens ; a *Herse convolvuli* ("Convolvulus Hawk-moth") labelled Walworth, 1849. The selected specimens, in spite of their age, are for the most part unfaded and in excellent condition.

157 Lepidoptera with good data were also selected from the specimens left in a cabinet purchased at Stevens in 1926.

The British Hymenoptera have also been enriched by an interesting series of Braconidae purchased from Mr. Lance Carr.

The Hope Library.

Col. J. W. Yerbury, the kind friend who so often helped us in our work and would always come to Oxford when he heard of our needs, was killed in a motor accident last autumn. He left to the Hope Department his entomological books and papers, with the provision that any not required should be offered to the Entomological Society of London. The Professor fortunately paid a special visit to London in order to inspect the books, &c., and was thus able to secure a long series of diaries which would probably have been lost or destroyed. These are of great interest in that they record the precise localities where Col. Yerbury made numerous captures of interesting Diptera. Col. Yerbury's separata are of value, even when copies already exist in the Department, because of the manuscript notes, and it is intended to bind them so as to form a short series of volumes dealing with this group of insects. There are not many duplicates, and of these but few were required by the Entomological Society. The attempt has been made, however, to find in the Department other duplicates which will be welcome to the Society.

The sudden severe cold of last December caused a pipe below the roof to burst, flooding one of the rooms in which books and papers were stored. The danger had been foreseen by the Professor, who was away from Oxford, but wrote, directing that the water should be turned off and the pipes

emptied. Unfortunately, however, the man who formerly performed these duties had left no explanation of the complicated system, and it appeared that the directions could not be carried into effect. As soon as the disaster was discovered the contents of the room, so far as they had suffered, were removed and spread out to dry, and no great harm has been done. The precious "Jones' Icones", in a closed bookcase, were quite unhurt; but the risk of water suggested that of fire, and a few days later a safe was purchased for them and other valuable manuscripts.

EDWARD B. POULTON.

Report of the Hope Professor of Zoology, 1928.

The amount of work carried on in the Department or elsewhere upon its material, during the past year, may be inferred from the list of published papers printed in a later section of this Report. It must be remembered, however, that more time than usual has been expended upon memoirs which could not be published in 1928, but have appeared or will appear in the present year. Among these must be mentioned Prof. E. G. R. Waters's fine list of the Micro-Lepidoptera of the Oxford District, in the "Proceedings of the Ashmolean Natural History Society" for 1928, published in 1929; Dr. F. A. Dixey's researches on the development of butterfly scales; the Professor's address on Adaptations promoting Crossbreeding in Insects, read before the International Entomological Congress at Ithaca, N.Y., a paper on the insect-food of British Bats to appear in the "Proceedings of the Zoological Society of London", and an article on Ants as Models for Mimicry in the "Festschrift" in honour of the 70th birthday of Fr. Erich Wasmann, S.J.

Among the papers published in 1928 I must refer to Dr. Eltringham's discovery of the silk-producing gland in

the feet of male L'impid flies belonging to the genus *Hilara*—one of the very few instances in which silk is secreted by a perfect insect—and Mr. Hamm's observations on its use in spinning a cocoon as a wedding-gift for the female.

A large amount of work has been expended upon the insects collected by the Oxford University Expedition to West Greenland in 1928. The species of several groups have been studied by eminent specialists and will, it is hoped, be recorded in the "Annals and Magazine of Natural History" in the near future. The large collection was made with great care and skill by Maj. R. W. G. Hingston, F.E.S. The Arthropoda other than insects have not as yet been studied.

Dr. Eltringham gave a series of lectures on the Insecta, as part of Prof. Goodrich's Zoological Course for students in the Department of Comparative Anatomy. Much time and thought were expended in selecting an illustrative series of specimens. These are now kept in a special cabinet and will be available for future lectures.

Among the accessions, I must specially refer to the fine collection of North Indian butterflies made by the late Col. Turenne Jermyn, nearly the whole of which has been presented by Mrs. Jermyn. The specimens were conveyed from Weston-super-Mare by motor-car and arrived without the slightest injury. The North Indian Lepidoptera are now strongly represented in the Hope Department by this collection, together with the late Maj.-Gen. J. G. Pilcher's splendid series of moths presented by Mrs. Pilcher. I must also mention here the series of Sumatran insects presented by Edward Jacobson of Fort de Kock, who has now added the Hope Department to the museums which have benefited by his generosity. This valuable gift is described in the list of donations on p. 15.

The growth of the collections has necessitated some considerable expenditure upon cabinets.

The Collection of Pierinae.

Dr. Dixey has been engaged in writing an historical account of researches upon the development of wings in insects from

the time of Malpighi and Swammerdam to the present day. This account is now completed and awaits publication. He has also continued his own researches on the same subject, and had expected to finish them in the course of the year, but was unable to do so in consequence of the failure of the species under investigation to produce a second summer brood. He has undertaken the preparation of a long series of drawings of Pierine androconia of which about half are now ready for reproduction.

Dr. Dixey has also worked out several collections of Pierines, including Dr. V. G. L. van Someren's from Lake Rudolf, Dr. G. D. H. Carpenter's and Capt. Pitman's from Uganda, Miss Vinall's from the Belgian Congo, Dr. Anderson's from Lagos, and Dr. Mansfield-Aders' from Zanzibar, the latter containing a species of *Teracolus* (*T. chromiferus*, Rothsch.), new to the Hope Collection.

The Collection of Orthoptera.

Dr. R. Hanitsch has published two papers referred to as in preparation in last year's Report. (1) "Spolia Mentawiensia : Blattidae", an account of the Blattidae obtained in the expedition to the Mentawi Islands under the leadership of Mr. C. Boden Kloss, Director, S. S. and F. M. S. Museums, accompanied by Mr. N. Smedley, Asst. Curator, Raffles Museum, Singapore, and by Dr. H. H. Karny, Entomologist to the Zoological Museum, Buitenzorg. The 53 species of Blattidae included 1 new genus (*Anaplectella*), 19 new species, and 1 new sub-species. Mr. Kloss generously presented all the types and one-third of the other specimens in this important collection to the Hope Department. (2) "The Blattidae of Rodriguez", describing a small collection of these insects made chiefly by Messrs. H. P. Thomasset and H. J. Snell in 1918, and including 9 species—3 cosmopolitan, and 6 hitherto undescribed, viz. 3 new species of *Theganopteryx*, and 3 of *Margattea*, all 6 exhibiting an interesting affinity with the Blattid fauna of the Seychelles.

Dr. Hanitsch has continued working out two large collections of Blattidae from Sumatra, viz. one from the East coast (Medan

and neighbourhood), made by Dr. E. Mjöberg, 1919-21, and one from the West coast (Fort de Kock and neighbourhood), by Mr. E. Jacobson, 1922-6. He also named a general collection of Blattidae for the Manchester Museum, and sent various Orthoptera for examination to Dr. L. Chopard, Paris, and to Dr. W. Ramme, of the Berlin Museum.

The British Collections.

The Hope Department lost a warm friend and benefactor by the death, on July 17, of F. C. Woodforde, B.A., F.E.S., Exeter, who, after retiring from the head-mastership of Market Drayton Grammar School in 1909, devoted nearly all his time and thoughts to the University collection of British Lepidoptera, giving the invaluable help gratefully acknowledged in many of these Reports, and briefly described in Commander Walker's Obituary Notice in the "Entomologist's Monthly Magazine" (vol. lxiv, 1928, p. 237), and referred to in the "Transactions of the Entomological Society of London" (vol. lxxvi, 1928, p. 523). "His great knowledge and kindly humour will long be missed in Oxford. We may find comfort in the thought that the years spent in helping others to study the insects he loved so well, were years which brought happiness to himself" (loc. cit.).

Prof. E. G. R. Waters has continued to give valuable help in the determination and arrangement of the Micro-Lepidoptera, and Commander Walker, as for so many years, in the Coleoptera. Here special mention must be made of the great additions to this collection, due to the generosity of Mr. Horace Donisthorpe, and acknowledged in a later section.

The British Aculeate Hymenoptera, presented by the Entomological Club in 1927, have been labelled and incorporated—1,594 specimens, 3 species being new to the collection, and including a series of 10 *Bombus distinguendus*; also a good series of several species hitherto only represented by very few examples.

Visits of Naturalists.

The following visitors have contributed specimens to the collections or in other ways helped in the work: B. G. Adams,

F.E.S.; Miss Balfour, F.E.S.; Dr. Malcolm Burr, M.A., D.Sc., New Coll.; J. E. Collin, Pres. Ent. Soc.; H. Donisthorpe, F.Z.S., F.E.S.; Col. C. Donovan, I.M.S.; H. Willoughby Ellis, F.Z.S., F.E.S.; Prof. F. Ll. Griffith, M.A.; Dr. G. A. K. Marshall, C.M.G., D.Sc., F.R.S.; Dr. S. A. Neave, M.A., D.Sc., Magdalen; Prof. R. Newstead, F.R.S.; B. B. Osmaston, C.I.E., M.B.O.U.; J. V. Pearman, F.E.S.; Prof. A. W. Pickard-Cambridge, M.A., F.E.S.; O. W. Richards, M.A., F.E.S., Brasenose; Capt. N. D. Riley, F.E.S.; C. F. M. Swynnerton, F.E.S., Director of Game Preservation, Tang. Terr.; W. H. T. Tams, F.E.S.; Dr. R. J. Tillyard, D.Sc., F.R.S.; C. J. Wainwright, F.E.S.

The following American naturalists have examined in the Department the insect material included in the groups of which they have made a special study: Prof. H. B. Hungerford, of the University of Kansas (Hemiptera: Notonectidae); Dr. C. F. W. Muesebeck (Hymenoptera: Scoliidæ); and Dr. H. F. Schwarz, of the Amer. Mus. Nat. Hist. (Hymenoptera: Meliponidæ).

It was a great pleasure to show something of the work of the Hope Department to Dr. Abraham Flexner, and to receive visits from the Rev. Mother S. Raphael (Miss Mary Paley) of Cherwell Edge, and Mrs. L. M. Moore, from Australia, great-nieces of William John Burchell, whose collections and detailed notes are among the most precious treasures of the University collection of insects. Also to show a part of the great collection of S.W. Abyssinian Lepidoptera to the generous donor, H. E. Arnold Hodson, C.M.G., Governor of the Falkland Islands.

The meeting of the Entomological Club took place on June 30-July 2, when the Department was visited by nine naturalists, whose names appear in the above list. The meeting was also attended by ten Oxford entomologists.

We shall greatly miss the kind help of Prof. A. W. Pickard-Cambridge, when naturalists come to study at the Arachnological Collection or Library, but I am sure that he will do all that is possible when he returns to Oxford from time to time.

*Fund for Promoting the Study of Social and Organic
Evolution.*

A grant of £10 was authorized towards the expenses incurred by Dr. H. Silvester Evans in making a fine collection of butterflies in Vanna Balavu, one of the East Fijian Islands. The specimens throw further light on the evolution of mimetic patterns in Fiji which formed the subject of a memoir subsidized by the Fund in 1924.

The discovery in recent years by M. Pouyanne in Algeria, confirmed by Col. M. J. Godfrey on the Riviera, interprets the insect-like appearance (and probable scent) of certain orchids as a stimulus to the males of bees nesting in the same locality. These males, in the absence of their females, which have not yet emerged from the pupa, are attracted to the flowers, carrying off the pollinia and fertilizing other flowers as they are visited in their turn. Mrs. Edith Coleman has now discovered that an Australian orchid is cross-fertilized by the same method, utilizing the services of a male Ichneumonid insect. A subsidy from the Fund has enabled the Entomological Society of London to publish her valuable memoir, with its abundant and in large part coloured illustrations, in the "Transactions" (1928, p. 533).

It has been recognized, almost from the first, that female butterflies are more generally mimetic of other species than their males, and that when both sexes mimic the females often attain a more perfect resemblance. This difference was formerly believed to be an adaptation to the special needs of the female, but later it was pointed out that females of many non-mimetic species appear in two or more forms and the males in only one, and that when each sex has but a single form that of the female is commonly more variable. Hence it appeared probable that the superior mimicry of the female was due to the more abundant material which that sex offers to the operation of natural selection. The relative variability of the sexes in Lepidoptera has now been investigated by the measurement of a large number of species, and a statistical examination of the data, by Dr. R. A. Fisher, Sc.D., F.R.S., and E. B. Ford, B.Sc., M.A., Wadham. Their researches prove that, in this

group of insects, the female is more variable even in the species with sexes nearly alike. In an appendix by the Professor the best-known example of female polymorphism in moths is described and illustrated with a coloured plate. A subsidy from the Fund has enabled this memoir to appear in the same volume of "Transactions" (1928, p. 367).

A subsidy has also made it possible to add a much-needed coloured plate to the very interesting memoir on the bionomics of the Lepidoptera of Matto Grosso, Brazil, by C. L. Collenette, F.E.S., and G. Talbot, F.E.S. This plate (XIV in Trans. Ent. Soc. Lond., lxxvi, 1928-9) illustrates the predominant combination of Matto Grosso butterflies displaying the pattern of the Ithomiine genus *Mechanitis*. It includes 3 species of *Mechanitis*, 4 species of other Ithomiine genera, 2 of *Danainae*, and 1 of *Pierinae*.

The grants authorized in aid of these three memoirs amount to £85 11s. 0d.

Hope Reports.

It is unfortunate that the pressure of other work, exceptionally severe in 1928, has prevented the preparation of an index and the issue of additional volumes, although the material for several is now in hand.

Published work in 1928.

References such as (23) indicate the page of the "Proceedings of the Entomological Society of London" for 1928, vol. iii; such as (Tr. 25) the page of the "Transactions" of the same Society for 1928, vol. lxxvi. The "Entomologist's Monthly Magazine", 1928, vol. lxiv, is indicated by (E.M.M.). The papers concerned with the Ethiopian and Palaearctic Regions are grouped under these heads, leaving those concerned with other Regions and general subjects in a third group.

Ethiopian Region.

K. G. Blair: "An insect-like vegetable growth found by Dr. Carpenter in Uganda" (23).

, Dr. G. D. H. Carpenter, D.M., M.B.E.: "Two Collections

of Butterflies from the S.E. Corner of the Sudan" (Tr. 25, pls. i-iii, and 2 text-figs.); "Further observations on insects in Uganda" (5); "The epigamic display of a male African dragonfly", with notes by the Professor (38); "A Uganda Bat preying on hawkmoths" (53); "The distastefulness of an Acraeine butterfly to a Chamaeleon" (53); "A Uganda moth mimicking an Ichneumonid", with a note on the use of the ovipositor as a sting by E. E. Green, F.Z.S. (54); "The larva and cocoon of the Elaterid beetle *Tetralobus flabellicornis* in Uganda", with comments by K. G. Blair and Dr. G. A. K. Marshall (73); "An Ichneumonid parasite of a Uganda caterpillar" (74); "The attacks of birds upon swarming bees in Uganda", with a note by Dr. Marshall (74).

Dr. R. Hanitsch, Ph.D.: "The Blattidae of Rodriguez", Ann. Mag. Nat. Hist., Ser. 10, vol. ii, 1928, p. 364, 6 text-figs.; "Description of *Ischnoptera pitmani*, a new species of cockroach, an African pest" (49 n.).

G. H. E. Hopkins, M.A., F.E.S.: "The dry and wet season forms of the butterfly *Precis sesamus* taken paired at Nairobi" (45); "Predaceous insects capturing the African Honey-bee" (45).

W. A. Lamborn, F.E.S.: "Notes on the 'Clothes-moth' *Tinea uterella* in E. and W. Africa" (72).

G. F. Leigh: "The proportions of the female forms of *Papilio dardannus* bred from wild larvae collected in the Durban district" (16).

Edward Meyrick, F.R.S.: "Description of *Acgeria ferox*, a new mimetic moth from Uganda" (54 n.).

Capt. C. R. S. Pitman, Game Warden of Uganda: "On the migration of Pierine butterflies in Kenya Colony" (17); "On Wagtails attacking butterflies in Kenya Colony" (17); "The area, in the West-Nile Province of Uganda, from which start the great southward migrations of the butterfly *Belenois mesentina*" (45); "The first African record of the American 'Clothes-moth' *Tinea uterella*" (46); "A new species of cockroach, a pest in tropical African houses" (48); "An African moth which appears to mimic a distasteful grasshopper" (49);

"On the courtship of the butterfly *Hypolimnas misippus* in Uganda" (82); "On the migration of Pierine butterflies in Uganda", with notes by J. E. M. Mellor, W. C. Simmons, C. B. Williams, and the Professor (83); "Further observations on *Tinea uterella* in Uganda", with notes by G. R. L. Hancock and Edward Meyrick, F.R.S. (92).

Capt. C. R. S. Pitman and Miss Vinall: "The migratory flight of the butterfly *Cymothoe caenis* in Uganda and the Belgian Congo" (70).

The Professor: "The different female forms of *Cymothoe caenis*, collected in 1928 in the Belgian Congo and Uganda", with notes by Dr. Carpenter, Miss Vinall, and C. B. Williams (88).

Dr. A. v. Schultess, of Zurich: "Zur äthiopischen Vespiden Fauna. (Hym.)—*Rhynchia synagroidea* et affinia" (Deutsch. Ent. Zeit., 1928, Heft. iv, p. 305, with 22 text-figs.).

Dr. V. G. L. van Someren, F.L.S., M.B.O.U.: "Living larvae of Ascalaphid *Allocarmodes kolbei* from Nairobi" (11); "Links between two African Danaine butterflies in the area between their respective ranges" (31); "Methods of collecting Lepidoptera" (33); "An observation confirming the hypothesis of a mimetic relationship between a female *Charaxes* and two common Euphaedras in Uganda" (65).

C. B. Williams, M.A.: "Resting attitude of an East African moth", with text-fig. (52); "Danaine and Acraeine butterflies eaten by birds at Amani, near Tanga, E. Africa", with comments by the Professor (91).

Palearctic Region.

H. L. Andrewes, F.E.S.: "Notes on the flight of two Pierine butterflies in Dorset" (78); "Apparent courtship of a female *Gonepteryx rhamni*, by a male *Colias edusa*" (79).

Prof. W. A. F. Balfour-Browne, M.A., F.R.S.E.: "A migratory Pyrale moth observed resting on sea and flying up at the approach of a ship", with notes by C. L. Collenette and the Professor (64).

K. G. Blair, F.E.S.: "On the pairing of the moth *Pachygastria trifolii*" (70).

Dr. G.V. Bull, M.B.: "The pairing of the Emperor moth" (37).

Dr. H. Eltringham, M.A., D.Sc., New College, and the Professor: "On the epigamic behaviour and pairing of *Pyrrhosoma nymphula*, a British dragonfly", with text-fig. (55).

Col. M. J. Godfrey, F.L.S.: "Further observations on the fertilization of *Ophrys fusca*" (10); "A male bee bearing pollinia of two species of Orchids" (38); "Fertilization of Orchids probably effected by bees seeking the flowers as a nocturnal shelter" (60).

Dr. J. G. Myers, D.Sc.: "Notes on all-female families in certain insects" (41); "Birds opening oak-galls in order to eat the insect contents", with notes by H. M. Edelsten, Miss Margery Fry, Dr. A. D. Imms, and the Professor (50).

Dr. J. W. Munro, Hon. M.A., D.Sc.: "Notes bearing on Unisexuality in Insects" (33).

Dr. R. C. L. Perkins, M.A., D.Sc., F.R.S., Jesus Coll.: "The distance at which a male moth, *Nemoria viridata*, is attracted by the female" (20).

The Professor: "Observations and experiments on distasteful insects in Tenerife" (17); "On the suggestion that 'assembling' male moths are attracted by 'wireless'" (20); "Reversal of the usual twig-like attitude in a British Geometrid caterpillar" (32); "The European Carpenter-bee *Xylocopa violacea* taken at Dulwich in 1855" (50); "Dark-coloured parasitized pupae of *Pyrameis cardui* found on a black iron fence at St. Helens, I.W." (68).

O. W. Richards, M.A., F.E.S., Brasenose: "A Revision of the European Bees allied to *Psithyrus quadricolor*, Lepeletier (Hymenoptera, Bombidae)" (35) (Tr. 345, pl. XI); "The species of *Notogonia* (Hymenoptera, Larridae), occurring in the Mediterranean Basin" (P.Z.S., pt. ii, 1928, p. 357).

Dr. R. J. Tillyard, D.Sc., F.R.S.: "Note on the Epigamic Behaviour and pairing of Dragonflies" (57).

Commander J. J. Walker, Hon. M.A., F.L.S.: "*Meloe rugosus* near Oxford" (E.M.M., p. 89); "Occurrence of *Danaida plexippus* in recent years near Oxford" (E.M.M.,

p. 90); "Immigrant Lepidoptera in 1928" (E.M.M., p. 186); "Autumnal butterflies at Oxford" (E.M.M., p. 276).

Prof. E. G. R. Waters, M.A., F.E.S.: "Abundance of *Lithocolletis geniculella*" (E.M.M., p. 12); "*Coleophora albidella* a distinct species" (E.M.M., p. 32); "A note on *Peronea shepherdana*" (E.M.M., p. 45); "Observations on *Coleophora caespitilella* and *C. glaucicolella*" (E.M.M., p. 47); "Further notes on the Coleophorinae" (E.M.M., p. 76); "Tineina in the Oxford district" (E.M.M., p. 172); "*Aegeria flaviventris* in the Oxford district" (E.M.M., p. 186); "Notes on the Nepticulidae" (E.M.M., p. 219); "*Nepticula albifasciella*, its early stages and its occurrence in Britain" (E.M.M., p. 248); Observations on *Glyphipteryx schoenicolella*" (E.M.M., p. 252).

Prof. E. G. R. Waters and the Professor: "A Madeiran Tineid moth taken in Ireland in 1902" (32).

The late F. C. Woodforde, B.A., F.E.S., Exeter, in collaboration with E. B. Ford, B.Sc., M.A., F.E.S., Wadham, and L. B. Prout, F.E.S.: "Varieties of British Lepidoptera in the Hope Department, Oxford University Museum", with an Introduction by the Professor (66) (Tr. 523, pl. xxii).

Other Zoological Regions, &c.

W. E. China and G. M. Henry: "A remarkable Homopterous larva from Ceylon", with text-fig. (20).

Mrs. Edith Coleman: "Pollination of an Australian Orchid by the male Ichneumonid *Lissopimpla semipunctata*, Kirby", with an introduction by the Professor and an Appendix by A. M. Lea, F.E.S. (57) (Tr. 533, pls. xxiii, xxiv, and 1 text-fig.).

C. L. Collenette, F.E.S.: "Javan butterflies bearing evidence of attacks by birds, &c.", including an observation made in N. Rhodesia by Dr. Malcolm Burr, M.A., D.Sc., New Coll. (36) (75).

C. L. Collenette and G. Talbot, F.E.S.: "Observations on the Bionomics of the Lepidoptera of Matto Grosso, Brazil" (58) (Tr. 391, pls. xiv-xix and 1 text-fig.).

W. G. Crawford: "The Resting Attitude of the Oriental Butterfly *Kallima*", with notes by the Professor (69).

Dr. H. Eltringham, M.A., D.Sc., New Coll.: "On the Abdominal Glands in certain North American Argynnid" (35) (Tr. 97, pl. vii); "On the Production of Silk by Species of the Genus *Hilara* Meig. (Diptera)," with an Appendix on the Habits of the Species, by A. H. Hamm, A.L.S. (Proc. Roy. Soc., B., vol. 102, p. 327, pl. 22, and 6 text-figs.).

Dr. R. A. Fisher, Sc.D., F.R.S., and E. B. Ford, B.Sc., M.A., Wadham: "The Variability of Species in the Lepidoptera, with reference to Abundance and Sex", with an Appendix "On the Male and Female forms of the African Pterothysanid moth *Hibrildes norax*, Druce", by the Professor (35, 58) (Tr. 367, pl. xii).

Dr. R. Hanitsch, Ph.D., "Spolia Mentawiensia: Blattidae" (Bull. Raffles Museum, Singapore, 1928, No. 1, pp. 1-44, 2 pls.).

C. M. Inglis, F.E.S., and the Professor: "Repeated attacks on a Euploine butterfly by a captive bird" (69).

F. F. Laidlaw, F.E.S.: "A Malayan Dragonfly devouring a Nymphaline Butterfly" (37).

C. H. Lankester, F.E.S.: "A female Long-horned Grasshopper *Mimetica tuberrata* from Costa Rica" (11).

E. Meyrick, F.R.S.: "Description of the Tineid moth *La-speyresia pyraspis* from Costa Rica (Entom., lxi, 1928, p. 231).

B. B. Osmaston, C.I.E., M.B.O.U.: "The behaviour of certain Oriental birds when given strong-smelling insects" (92).

J. V. Pearman, F.E.S.: "Some Psocoptera from the New Hebrides" (E.M.M., p. 133, with 9 text-figs.).

The Professor: "Adaptations which discourage in-breeding in Lepidoptera, &c.", including observations by Miss M. E. Fountaine; Prof. J. W. Heslop Harrison, F.R.S.; Dr. E. Hindle, Ph.D.; E. Lindner; H. W. Simmonds (18); "The earliest account, in 1826, by W. J. Burchell of the American 'Clothes-moth' *Tinea uterella*" (47); "H. W. Bates on the swarming of ants and Termites as an adaptation to ensure intercrossing" (65); "Insects taken on a ship hundreds of miles from land by Dr. W. C. Pakes" (87); "Intraspecific Selection, an attempt to explain the Origin and Meaning of Certain Examples of

Mimicry" (P.Z.S., pt. 4, 1928, p. 1037); "Scents of Butterflies" (Journ. Darjeeling Nat. Hist. Soc., vol. 2, No. 3, p. 47, Dec. 1927).

Capt. N. D. Riley, F.E.S., and the Professor: "The Rhopalocera of the 'St. George' Expedition, from French Oceania" (58) (Tr. 453, pl. xxi, f. 12 and 13, and 2 text-figs.).

H. W. Simmonds, F.E.S.: "All-female-producing females of the butterfly *H. bolina*, a persistent strain in Viti Levu, Fiji" (43).

H. Womersley, F.E.S.: "Apterygota from the New Hebrides" (Ann. Mag. Nat. Hist., Ser. 10, vol. ii, p. 55, pls. v, vi, 1928).

ADDITIONS TO THE COLLECTIONS.

Donations incorporated in 1928.

Many of the following donations, received before 1928, are indicated by the year, e. g. (1917), following the name of the donor. When no date is thus inserted 1928 is to be understood.

Several accessions include the material recorded in the publications of the Entomological Society of London. References such as (Tr. 25) and (54) indicate respectively the Transactions and Proceedings of 1928, those of other years being quoted as "Proc." and "Trans.", with the addition of the year and page.

Ethiopian Region.

Dr. G. D. H. Carpenter, M.B.E., D.M. (1917): 3 ♂ and 3 ♀ forms of the moth *Hibrildes norax*, shown in figs. 1-6 of pl. xii, Trans., 1928, all taken 4-27 Dec. 1917, at Lulanguru, 17 m. W. of Tabora, Tang. Terr. Fig. 4 is the ♀ form *carpenteri*; (1926): 40 butterflies from the S.E. Sudan, including types and paratypes of the following species: *Papilio rex franciscæ*, *P. nobilis didingensis*, *Mylothris ruppelli septentrionalis*, *Amauris lobengula mongallensis*, and *Eagris lucetia obliterated*, all described and figured by the donor (Tr. 25); (1927): ♀ type of the mimetic Tineid moth *Aegeria ferox*, Meyrick, captured as its ichneumonid model, in N. Uganda (54).

J. E. M. Mellor, F.E.S.: A red and black ♂ bee, *Andrena combusta*, together with the red and black Acraeine butterfly it was chasing, probably attracted by a coloration like that of its own ♀, Amani, near Tanga, E. Africa (Proc. of 6 Feb. 1929); 1 ♂ Lycaenid butterfly *Spalgis lemolea* from the Governor's Garden, Zanzibar, where the larvae were feeding on Coccidae (Proc. l. c.).

Capt. C. R. S. Pitman: ♀ type and paratype of the new Blattid *Ischnoptera pitmani*, Hanitsch, from Entebbe, Uganda (49). Also 2 ♂ received later and described by Dr. Hanitsch in Proc. of 6 Feb. 1929.

W. C. Simmonds, F.G.S., and Mrs. Simmonds (1927): The very interesting series of butterflies collected in August 1926 on Kome I., in the Victoria Nyanza, and described in detail in Proc., 1927, p. 60.

Dr. V. G. L. van Someren, F.L.S., M.B.O.U. (1924): 4 ♂ and 2 ♀ bred from the eggs laid by a Danaïne butterfly, together with the ♀ parent, *D. chrysippus* of the form *dorippus*. Except for one *chrysippus* ♀, all the offspring were *dorippus*. The conclusion, thus proved to be sound, that these two forms belong to the same species has been doubted by eminent naturalists (Proc., 1924, p. cxxiii; 1925, p. ix); (1926): The 8 families of *Acraea esebria*, as described in Proc., 1927, p. 8, including type and paratypes of ♀ f. *victoris*. The hereditary relationships of the various forms of this butterfly in the Nairobi district, the proportions of the sexes, and the order of their emergence are well illustrated in this fine series of 236 specimens; (1927): 1 *Planema p. poggei*, an Acraeine butterfly from Kaimosi, W. Kenya Col., 1922. This example of a southern race was taken in the area of the northern, *Pl. p. nelsoni* (Proc., 1927, p. 37); ♂ type and ♀ paratype of the Acraeine butterfly *Planema elgonense*, from N.E. Uganda, 1922 (l. c.).

C. B. Williams, M.A., F.E.S.: 24 wings of Danaïne and Acraeine butterflies and 1 of a moth found amid weeds on doorstep of a disused house at Amani, nr. Tanga, E. Africa; evidently discarded by a bird which had eaten the bodies. Beak-marks are on several wings (91).

Col. R. S. Wilson (1918): 3 ♂ (including type), 3 ♀ and a batch of eggs of the new Lasiocampid moth *Chrysopsyche wilsoni*, Tams, from the Nuba Mtn. Prov., Sudan.

Other Zoological Regions.

H. St. J. K. Donisthorpe, F.Z.S., F.E.S. (1925): An interesting series of 159 insects of various groups, all with excellent data, from the Bordighera district.

Prof. W. A. F. Balfour-Browne: 2 migrating moths, *Nomophila noctuella*, flying up from the surface of the calm sea about 415 m. W. of Avonmouth on 20 July 1928 (64).

Col. M. J. Godfrey, F.L.S.: 1 ♂ bee, *Andrena trimmerana*, taken visiting the Orchid, *Ophrys fusca*, and bearing a bunch of about 7 pollinia on the end of its abdomen, Hyères, April; also 1 ♂ bee, *Colletes cunicularia*, visiting *Ophrys arachniformis* and bearing 3 pollinia on its head, nr. Hyères, March 1921 (11); a ♂ bee, *Anthidium septemdentatum*, bearing on its head the pollinia of two species of Orchid, *Serapias cordigera* and *S. neglecta*. Taken in a flower of *S. cordigera* by Col. G. H. Evans at Valescure, Riviera (38).

Dr. Charles Hose, Sc.D.: 242 Lepidoptera collected by W. Foster at Sapucay, Paraguay, 1903-05. Of the species 12 are new to the collection, and all of them, coming from a locality but little represented in the Department, are a most valuable accession.

Edward Jacobson, of Fort de Kock, Sumatra: A very valuable series of Sumatran insects named by eminent authorities in the various groups, and including 46 Coleoptera, 4 Diptera (a paratype of *Gnophomyia jacobsoni*, Alex., included), 2 Hymenoptera, 9 Odonata, and 18 Orthoptera (a co-type of the Acridian, *Paratraulia elegantula*, Will., included).

F. F. Laidlaw, F.E.S.: A Malayan dragonfly and its butterfly prey (37).

C. H. Lankester, F.E.S. (1922): The type of the Tineid moth *Laspeyresia pyraspis*, Meyrick, from Cartago, Costa Rica (Entom., 1928, p. 231).

Miss Agnes Lickfold (1917): The type of the moth *Pococera*

jocara lickfoldi, a new sub-species from Trinidad, described by W. J. Kaye, F.E.S.

B. B. Osmaston, C.I.E., M.B.O.U.: 30 butterflies, with excellent data, from Kashmir, Baltistan, and Ladak, including many species much wanted by the University Collection.

Major H. M. Pendlebury, F.E.S. (1926): 2 Aculeate Hymenoptera and their mimics from the Federated Malay States, including two new species described by the donor and one by Cedric Dover. One of the models is mimicked by two Diptera, a Syrphid and a Tachinid, the other by another Aculeate, *Cerceris* (Proc., 1926, p. 38).

The Professor (1926): The ♂ type and a large series of ♂ and ♀ paratypes of the north European race of the Small Tortoiseshell Butterfly, *Aglaia urticae septentrionalis*, described in Proc., 1927, p. 25. A northern form of this butterfly, known as *polaris*, is an exceptional aberration, while the race itself remained undescribed. A comparison between Norwegian specimens bred from larvae collected at Balholmen by the Professor; Ulvick, Eid Fjord, by J. W. Bodger, F.L.S.; and captured by Miss Cynthia Longfield, F.E.S., in the Lilledal Vall., Sundal Vall.; and by A. E. Gray, at Loen, showed the uniform presence of distinctive racial characters. The series now incorporated includes the specimens kindly presented by the above-named donors. The pupa-cases of the bred specimens have been added to the collection and, even in the dry state, show clearly the effect of the dark or light surroundings to which the larvae were subjected before pupation.

Commander J. J. Walker (1919): The type of *Pieris nagarum cisseis*, Talbot, ♀, taken by C. T. Bowring at Che-Kiang, Sunyang, China.

Additions to the British Collections.

B. G. Adams, F.E.S.: Many interesting specimens from the collection of the late J. J. Lister, F.R.S., including 230 butterflies, 349 moths, and 128 specimens of other groups. A high proportion were collected at Grantchester, Cambridge, and the data of all are precise and detailed. A large number of Palaearctic and Ethiopian specimens will be acknowledged in a future Report.

H. St. J. K. Donisthorpe, F.Z.S., F.E.S.: 406 British Coleoptera, including 2 *Tachys micros* new to the Collection, 3 *Helophorus nanus*, 2 *Amphotis marginata* taken with the ant *Lasius fuliginosus*, 1 bred *Elater rufipennis*, 1 bred *E. niger-rimus*, 1 *Rhynchites interpunctatus*, 1 ♀ *Ludius ferrugineus*, *Tachysida gracilis* new to Britain, and many other rare and interesting species. The majority of these beetles were taken in Windsor Forest, making altogether 777 species from this interesting locality, and 2,256 British species presented by the generous donor. Also, the following British insects, many from Windsor Forest: 2 Orthoptera, 38 Rhynchota, 7 Hymenoptera, and 11 Diptera, including 5 *Dendrophaonia querceti*, bred from a bird's nest, 2 *Limosina curtiventris*, determined by J. E. Collin, and an Empid fly with its prey. In addition to the above, 2 *Gnathoncus punctulatus*, a Histerid beetle, from a crow's nest in Windsor Forest, and from the same locality the rare and interesting mimetic Syrphid fly *Pocota apiformis* (with its puparium), bred from a larva found in the centre of a large ash-trunk, 50 ft. from the ground (36); (1926): 222 mounts of Coleoptera, a large proportion from Windsor Forest, including *Elater rufipennis*, not taken for many years, represented in the Hope-Westwood Coll. in 1926 by a single ancient specimen, and now reinstated on the British list by the donor: 6 *Dryophthorus corticalis*, new to Britain: 19 mounts of Hemiptera, including *Aneurys laevis* taken at Shapwick with the ant *Lasius niger*: 9 other insects, including an Empid fly with its Dipterous prey.

Rev. L. W. Grensted, B.D., M.A., Univ.: 23 Neuroptera, with excellent data, from the Oxford district. Determined by K. G. Blair, F.E.S., and W. J. Lucas, F.E.S.

A. R. Heath (1927): 363 British Lepidoptera collected by the late R. H. Heath. The precise data and varied localities confer much interest on the collection, which includes 2 bred *Cosmia pyralina* from Wembley Park (1893-4).

E. M. Poulton (1927): 1 Geometrid moth, pupa-case, and cocoon, St Helens, I.W. (32).

The Hope Library.

The generous presentation of publications of Universities,

Museums, and other institutions in many parts of the world has continued as in previous years. An especially interesting donation—Dr. Auguste Forel's "Social World of the Ants compared with that of Man", Vols. II and III, translated by C. K. Ogden—is due to the kindness of Commander J. J. Walker. G. V. Hudson's fine work on the "Butterflies and Moths of New Zealand" has been purchased, also valuable works on the Micro-Lepidoptera from the library of the late J. Hartley Durrant. These latter include the copy of H. T. Stainton's "Tineina of Southern Europe" (1869), presented by the author to T. Wilkinson, another authority on the Micro-Lepidoptera; also 13 parts of "Exotic Microlepidoptera" by Edward Meyrick, F.R.S.

EDWARD B. POULTON.

